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PEPSIN ASSAY.

By M. B. Manwaring.

To obtain reliable results, the conditions herein specified, however unimportant some of them may appear, must be carefully observed when testing the proteolytic power of pepsins.

Prepare an excessive quantity of acidulated water, containing 0·2 per cent. absolute hydrochloric acid (HCl), thus:

Hydrochloric acid, U. S. P.	48 min. or 3 cc.
Distilled water sufficient to make	16 fl. oz. or 473 cc.

For every 1,000 grains of albumen required provide 2·17 fresh eggs. Put the eggs in boiling water and boil for fifteen minutes, then cool them with cold water. Separate the whites by the aid of a perfectly clean and bright spatula (preferably of bone), and if necessary wash away any adhering yolk and dry the coagulated albumen with a clean towel. Press the whites through a 30-mesh hair sieve; avoid if possible using a brass sieve.

The acidulated water and the coagulated albumen being ready, as also a water-bath at a temperature of 105° F.

Weigh *exactly*, pepsin,	½ gr.
Weigh with approximate accuracy coagulated albumen,	1250 gr.
Measure acidulated water,	27 fl. oz.

Carefully transfer the pepsin to a wide mouth bottle or flask of about 2½ pints capacity, adding a little of the measured portion of acidulated water. If the pepsin is in scale form, and the day is damp, so that the pepsin is inclined to become sticky, it should be

weighed as quickly as is consistent with accuracy on a balanced watch-glass or evaporating dish, and if any sticks to the dish it must be rinsed out with some of the acidulated water and thus all transferred to the bottle or flask. The weighed albumen is to be triturated in a small mortar with some of the acidulated water, and the mixture then poured into the bottle containing the pepsin, using the remaining acidulated water for rinsing purposes. The corked bottle and contents are now to be subjected to the heat of the water-bath, maintained at 105° F. as nearly as possible, for 6 hours, being well shaken not oftener than once every five minutes and at least every ten minutes, always restoring the bottle to the bath quickly. At the end of 6 hours, if the pepsin tests 1 : 2,500, not more than a few undissolved flakes should remain, consisting mostly of the membraneous portion of egg.

If the means of weighing are sufficiently accurate, it is an advantage as regards labor and time to use ¼ gr. of pepsin instead of ½ gr., reducing correspondingly the albumen and acidulated water, or, accuracy may be attained and still less materials used, by thoroughly triturating in a small Wedgewood mortar 1 gr. of a pepsin with 9 gr. sugar of milk, 1¼ gr. of the mixture containing ⅛ gr. of the pepsin. The greatest care is necessary in weighing the pepsin, for $\frac{1}{100}$ part of a grain of a 1 : 2,500 test pepsin dissolves 25 gr. of albumen. Prescription weights and scales are generally far too inaccurate for operating with less than ½ gr. of pepsin. It is certainly advisable to provide a set of accurate grain weights.

The foregoing proportions of materials are given for the purpose of enabling one to prove whether or not a pepsin test 1 : 2,500; or, which of two or more brands most closely approximate this power, in which case the same *quantities* of materials are always to be used.

If testing a pepsin claimed to be of higher or lower power than 1 : 2,500, it is necessary to observe the same conditions given, and maintain the same proportions of albumen and acidulated water, varying only the quantity of pepsin—for instance, in testing a 1 : 2,000 pepsin, use one-fourth more pepsin, thus, albumen 1,250 gr. + acidulated water 27 fl. oz. + a 1 : 2,000 test pepsin ⅝ gr., or of a 1 : 2,500 test pepsin ½ gr.

If a pepsin is of unknown strength, its proportion must vary until the quantity is found which will practically dispose of all the albu-

men present within the prescribed time, and under the conditions given. This, of course, requires a series of trials. From this ascertained proportion is figured the power, thus: if twice as much of one pepsin as of another is required to do the same work under like conditions, with no excess of albumen present, then the former pepsin has one-half the power of the latter; or if one-half as much is needed then it tests double that of the other—the dissolving power of a pepsin is inversely proportional to the quantity of pepsin required.

A 100 Minute Assay.—The writer has found that any pepsin tested under the following conditions, will dissolve exactly one-half as many times its weight of coagulated albumen as by the 6-hour test, in 100 to 105 minutes. We can thus obtain reliable results without so much sacrifice of time—a pepsin dissolving 1,000 times its weights of albumen at 125° F. in 100 minutes, will dissolve 2,000 at 105° F. in 6 hours. The conditions are: The same relative proportions of the acidulated water and albumen as by the long time test; but one-half of each as compared with the weight of pepsin used; temperature 125° F.; agitation every 5–10 minutes; time 100–105 minutes; practically complete solution of all the albumen present. Hence the following formula—for the sake of even numbers and a unit, a 1 : 2,000 test pepsin is designated.

Take pepsin (1 : 2,000 by the 6-hour test), .	0·01	parts, or gm. or ¼ gr.
Coagulated egg-albumen (fresh egg, boiled 15 minutes, white pressed through 30 mesh hair sieve, . . .)	10·	parts, or gm. or 250 gr.
Distilled water containing 0·2 per cent. HCl, ...	100·	parts, or gm. or cc. or 5½ fl. oz.

Using the above designated number of *grams*, a flask is required of at least 100 cc. capacity when about two-thirds full; or 5½ fl. oz. for the *grain* weights given. For every 100 gm. of albumen required provide 3·33 fresh eggs. Measure the prescribed quantity of acidulated water at ordinary laboratory temperature. Put the pepsin in the flask with a little of the acidulated water; follow with the albumen previously triturated with some of the acidulated water; rinse mortar and neck of flask with remaining acidulated water, and immediately set flask in a water-bath, which is already at 125° F. Maintain this temperature within a degree above or below for 100–105 minutes, rotating flask every 5–10 minutes. If

several tests are to be compared as to relative quantities or residual albumen, should there be any, the flasks should be rapidly cooled to below 60° F. In determining the power of different pepsins, the only allowable variation from above formula should be the proportion of pepsin—of a pepsin testing 1 : 2,500 in 6 hours, 0·008 gm. would be required to do the work of 0·01 gm. of a pepsin testing 1 : 2,000 by the 6-hour test.

Generally the operator knows enough about a pepsin to be assayed, to judge closely as to the quantity to use. In any event he can soon determine by one assay whether or not a given brand is of the power claimed for it. If nothing is known about a pepsin to be assayed, one test with 0·01 gm., another with more, and a third with less of the pepsin, can be made simultaneously, and judgment formed from results about the quantity required for the final test. As a safeguard, and especially to provide against variations in albumen, it is advisable always to carry through one control test with a pepsin of known power.

When several tests are to be made of one brand of a soluble pepsin, or when minute quantities cannot be accurately weighed, it is often an advantage to make a solution of a known quantity of pepsin in acidulated water, bringing the solution to a known volume. By this means any required quantity of pepsin can be accurately and quickly apportioned by measure. In such cases 0·1 gm. of pepsin, plus acidulated water (containing 0·2 per cent. HCl) sufficient to measure 100 cc., makes a solution of which 1 gm. pepsin is represented by 1,000 cc.

ESTIMATION OF EUGENOL IN OIL OF CLOVES.

By Joseph C. de la Cour, Ph.G.

From an Inaugural Essay.

The method proposed by H. Thoms (*Phar. Centralhalle*, 1891, p. 589) for the estimation of eugenol is based upon the formation of benzoyl-eugenol, and is carried out as follows: 5 gm. of the oil, 20 gm. of solution of sodium hydrate and 6 gm. benzoyl chloride are placed in a tared beaker of 150 cc. capacity and thoroughly mixed; the mixture becomes quite hot, and after it has cooled again, 50 cc. water are added and heat is applied until the crystalline mass melts, after which the mixture is again allowed to cool; the clear liquid is run

through a filter, previously dried at 101° C. and weighed, and the operation of washing the crystals is repeated twice with 50 cc. of water. To remove the sesquiterpene, contaminating the benzoyl-eugenol, the crystals are washed with alcohol by adding to the still moist mass in the beaker 25 cc. alcohol of 90 per cent., warming until solution is effected, and then rotating the liquid until crystals begin to separate, when the contents of the beaker are allowed to cool to 17° C., transferred to the weighed filter and washed with a little 90 per cent. alcohol until the filtrate measures 25 cc.; the filter and contents are now transferred to the beaker, dried at 101° C. and weighed. To the weight of the benzoyl-eugenol thus obtained, 0·550 gm. must be added, representing the amount soluble in the 25 cc. of 90 per cent. alcohol. This weight, multiplied by 164 (the molecular weight of eugenol) and divided by 268 (the molecular weight of benzoyl-eugenol) gives the amount of eugenol in 5 gm. of the oil; to obtain the percentage, multiply again by 20.

In performing the experiment, the author suggests to pour into the tared beaker containing the oil, simultaneously from two separate vessels, the sodium hydrate and benzoyl-chloride, and then stir with a glass rod. The results obtained were as follows:

		Specific Gravity.	Eugenol. Per Cent.
(1)	Oil of cloves, distilled by author, ...	1·0675	77·96
(2)	" commercial, ...	1·0514	78·74
(3)	" "	1·0502	75·08
(4)	" "	1·0483	72·26
(5)	" "	1·0490	74·22
(6)	" old, distilled by Professor Remington, ...	1·0752	75·74
(7)	" clove stems, distilled by author, .	1·0552	87·10
(8)	" " commercial, ...	1·0441	80·34
(9)	" "	1·0452	77·78

These results agree with the observation of Dr. Thoms that the specific gravity has no uniform relation to the percentage of eugenol present, and that, besides the eugenol and terpene, probably a third compound is present in the oil which may account for the variation.

It will be observed that all the commercial samples are rich in eugenol, also that the oil of clove stems, although not so fragrant, shows a rather larger percentage of eugenol.

NOTE BY THE EDITOR.—According to the semi-annual report of Schimmel & Co. (April, 1892, p. 20), the method yields concordant

results within the limits of 1 per cent., but is not suitable as a practical pharmacopœial test on account of the time its execution occupies. While the suggestion of Thoms, that a minimum percentage of eugenol in clove oil should be a pharmacopœial requirement in the future, is well worthy of consideration, it is suggested by that firm that eugenol be employed in place of oil of cloves, since the former can be prepared in a state of purity without difficulty, and its purity easily determined. For the latter purpose it is only necessary to observe the specific gravity (1·072 at 15° C.) and boiling point (253–254° C.), and to ascertain that it forms a clear solution in potash solution of 2 or 1 per cent.

EUPATORIUM PERFOLIATUM.

By Henry F. Kaercher, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 115.

The leaves and flowering tops of this plant have already been examined by several investigators, but the underground portion does not appear to have been analyzed.

A quantity of the root was collected in Northeastern Ohio, and, after carefully drying, was submitted to proximate analysis with the following results:

	Per Cent.
Fat and resin (soluble in ether),	0·60
Resin and bitter principle (soluble in alcohol),	1·59
Mucilage,	1·75
Dextrin,	3·00
Glucose,	1·45
Saccharose,	5·60
Undetermined extractive (soluble in water),	4·90
Soluble in dilute sodium hydrate solution,	2·42
Soluble in diluted hydrochloric acid,	2·70
Inulin,	4·90
Other products (soluble in hot water),	3·40
Lignin,	17·62
Cellulin,	24·69
Ash,	10·67
Moisture,	12·40
Loss,	2·31
Total,	100·00

The inulin was estimated in a separate portion of the drug, according to Dragendorff's method, with the above results.

The alcoholic extract was soluble in acidulated water to the extent of one-third of its weight. The solution was bitter, and gave evidence of the presence of a glucoside.

Ferric chloride gave faint indications of tannin. A portion of the aqueous solution of the alcoholic extract was agitated successively with petroleum ether, stronger ether and chloroform. No residue was left on the spontaneous evaporation of the petroleum ether and stronger ether, but chloroform left a minute quantity of colorless crystals.

In order to more fully investigate the constituents, about one kilogram of the powdered drug was exhausted with 95 per cent. alcohol, and the solvent recovered. The residue was poured into two volumes of water and the resin, which precipitated, was filtered out. The solution was then agitated successively with petroleum ether, ether and chloroform. The results were similar to those obtained with the alcoholic extract. The aqueous solution was then made alkaline with sodium hydrate, and submitted to the same solvents in the order above given. Petroleum ether and ether removed nothing of importance, but chloroform extracted a bitter, brown, resinous substance. This was redissolved in water and again extracted by agitation with chloroform. On the spontaneous evaporation of the latter solvent, a light pink, amorphous, and intensely bitter substance remained. Several attempts were made to obtain this residue in a crystalline form, but without success. It gave no reactions with either alkaloidal or glucosidal reagents. Any medicinal virtue that this drug may possess is no doubt due to this amorphous bitter principle.

The crystalline principle removed from the acidulated solution by chloroform possessed all the characters of a resin.

EUPATORIN: THE ACTIVE PRINCIPLE OF *EUPATORIUM PERFOLIATUM*.[1]

By C. H. Shamel.

The dried *eupatorium perfoliatum*, gathered at blooming-time, was extracted by hot alcohol in a continuous extraction apparatus

[1] Amer. Chemical Journal, 1892, xiv, p. 224. A crystalline glucoside was isolated by G. Latin and F. W. Franz, see American Journal of Pharmacy, 1880, p. 392, and 1888, p. 77. See also paper by H. F. Kaercher, above.

for several hours. The excess of alcohol was distilled off and the thick residue treated with water acidulated with hydrochloric acid. A black gummy mass separated, which was removed by filtration, the filtrate neutralized with sodium carbonate and extracted with ether. On evaporation of the ether the active principle was deposited, either as a yellow resinous mass or as a yellow powder, which, on examination under the microscope, was found to consist of globular masses of needle-shaped crystals. The crystalline variety was analyzed for nitrogen, but was found to contain none. The principle, in both the amorphous and crystalline forms, was insoluble in water, in concentrated sulphuric acid and in concentrated hydrochloric acid, but was soluble in even dilute nitric acid with a light-brown coloration. The nitric-acid solution, when allowed to evaporate spontaneously or in a vacuum over lime, crystallizes in beautiful prisms and six-sided plates.

An aqueous solution of these crystals injected into mice killed them in a few hours. The crystals, when taken into the mouth, have first an acid taste from the nitric acid they contain, followed by a very bitter taste. The aqueous solution has only the bitter taste.

Chemical Characteristics.—The crystals of the nitrate are easily soluble in water and melt at 102–103°. The principle itself does not melt, but at 250° suffers partial decomposition.

The solution of the nitrate was tested with the common alkaloid reagents, but gave the following reactions only: Phospho-molybdic acid, a green color; picric acid, a few needle-shaped crystals; auric chloride, colored slightly.

The principle is soluble in the alkalies. The solution in sodium hydroxide gave the following reactions, parallel tests being made with the sodium hydroxide solution alone: Phospho-molybdic acid, an instantaneous brilliant green coloration which soon fades; auric chloride, a black flocculent precipitate; picric acid, a deep-red coloration.

The ultimate analysis of the crystallized nitrate deprived of its water of crystallization gave the following figures:

C	H	O	N
25·7 per cent.	3 1 per cent.	64·2 per cent.	1·55 per cent.
26·2	2·7	64·1	1·6

Or calculating the N as HNO_3, we have HNO_3 { 6·97 per cent. / 7·20

These figures would indicate that the formula is $C_{20}H_{25}O_{36}HNO_3$, which would require the following as the theoretical composition.

C—26·49 per cent. H—2·76 per cent. O—64 per cent.
N—1·54 per cent. = HNO_3—6·96 per cent.

GILLENIA STIPULACEA, *NUTTALL.*

By Gordon L. Curry, Ph.G.

From a thesis presented to the Louisville College of Pharmacy, and published in the American Practitioner and News, May 7, 1892, p. 294–298, we make the following abstract relating to the analysis of the subterraneous organs which, on drying finally in a hot-air oven, lost 42·9, and in another experiment 35·9 per cent. of moisture; on incineration 10 gm. of the powder left 0·16 gm. ash.

Benzene extracted from 20 gm. of the powder 0·30 gm. fat, partly liquid. The ethereal extract subsequently obtained was partly—about one-third—soluble in water, and nearly two-thirds soluble in alcohol, both solutions being bitter, but free from alkaloids. For the isolation of the bitter principles, 200 cc. of infusion were prepared from 20 gm. of the powdered drug with hot distilled water, and the liquid agitated with ether.

The ethereal liquid was evaporated in a beaker glass and at a low temperature, leaving a small amount of slightly yellowish crystalline residue. A portion of this residue, on being dissolved in acidulated water, decomposed Fehling's solution very readily. The remainder of the residue was dissolved in water, treated with ether, and the ethereal layer evaporated yielding a small amount of white, feathery crystals, soluble in water, alcohol, and dilute acids. After boiling with sulphuric acid and treating with Fehling's solution, a reduction of the copper immediately ensued. Other tests for glucosides produced positive results. The glucoside is colored red by sulphuric acid; yellow by nitric acid, and deepens the color of chromic acid. The author proposes the name *gillein* for this body, which in the dose of ¼ grain was observed to produce nausea, approaching emetic action.

The aqueous infusion after having been treated with ether, deposited in a few days a pinkish powder, brown after drying, insoluble in alcohol and water, of a bitter taste, and colored different shades of yellow with the reagents named above. The sherry-colored

filtrate, evaporated on a water-bath, produced a dark brown residue, which on examination showed the presence of sugar, gum, extractive, and a tannin striking a greenish-black color with a solution of ferric chloride.

The aqueous layer of the second ethereal treatment, on concentration, acquired a yellowish color. Before heating and during evaporation this liquid produced no reaction with Fehling's solution, unless previously heated with sulphuric acid showing the stability of the glucosidal body. The residue left on evaporation was treated with little water, the solution filtered from the reddish flocculent residue, and evaporated, leaving an amorphous substance soluble in water, sparingly so in alcohol and ether and presenting all the reactions of a glucoside, for which the name *gillëenin* is proposed. In this condition it is inodorous, yellowish, of a faint taste at first, but becoming very bitter, and shows no reaction with iron salts or gelatin, and no color reaction with the acids mentioned above. The quantity being quite small, its action when taken internally was not determined.

These principles are evidently different from the *gillenin* obtained by W. B. Stanhope, from *Gillenia trifoliata* (see Amer. Jour. Pharm., 1856, p. 200), which was colored blood-red by nitric acid, and green by chromic acid.

Note is made by Stillé and Maisch that the dust of Cephaëlis Ipecacuanha attacks the mucous membrane of the nose and throat, producing congestion of the larynx and bronchia, causing coughing and sometimes rejection of fibrinous sputum. In comminuting the Gillenia stipulacea the dust arising from it caused, like the aforementioned plant, dryness of the nose and throat, and left a slight congestion of the larynx, which did not wear off for about twenty-four hours. A convenient form of administration will no doubt be secured in the tincture, made 10 per cent. in strength with 50 per cent. alcohol. Another form, and the one more usually employed, is the decoction. The mention by Barton of this species being the more valuable, as well as its remote use by country folk, would seem to indicate its medicinal value, and would warrant a trial by the medical fraternity.

Petroleum has been found in Peru, near the seashore. Spec. grav., ·810 to ·840. It is rich in low-boiling constituents.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Decoction of Vaccinium Vitis-idæa in rheumatism.—In 1887, Dr. Sanine proposed the use of the cowberry plant, *Vaccinium Vitis-idæa* for rheumatism. Following this, Dr. Herman administered the decoction with good success to three patients, one being an old man who was suffering for three and one-half years with muscular articular rheumatism.

Dr. Smirnoff (*Wratch*, through *Bull. de Thérapeut.*, 1892, p. 470), used a decoction of the whole plant in the proportion of 30–60 gm. to 500 cc. water. The decoction is dark in color, not clear, has a bitter taste and neutral reaction. Nine patients were treated; with seven a cure was effected, with two no effect whatever, was produced. The treatment lasted from three weeks to three months.

Phloroglucin in plants.—To determine the presence of phloroglucin T. Waage (*Ann. Agron.*, 1892, p. 204) makes use of Günzburg's reagent (see Amer. Jour. Phar., 1888, p. 240); one drop of the vanillin solution (0·005 in 4·0 HCl) will detect 0·001 mgm. phloroglucin. He observed that gymnosperms are rich in phloroglucin, monocotyledons and gamopetalæ contain little, and polypetalæ are destitute of this compound. As a rule, woody plants are richer than herbs, but the distribution in root, stem and leaves of the same plant is nearly uniform. The author regards it as a by-product of plant life; it enters into the formation of very complex principles (phloroglucosides), is connected with the production of phlobaphenes and certain coloring matters, and is usually met with in plants containing tannin.

Atropine in hyperacidity of the stomach.—Dr. Voinovitch (*Bullet. de Thérapeut.*, 1892, 471) based on the experiments of Drs. Netschaeff and Popoff, exhibited sulphate of atropine in a case of stomachal hypersecretion. The dose used was three-quarters of a milligram three times a day by the mouth. After the third day pain had stopped and vomiting had ceased. After the tenth day the gastric juice was examined and found to be almost normal.

Hydrastis canadensis in the vomiting of pregnancy.—Dr. Fedorow (*Rev. de Thérap.*, 1892, 388) gives 20 drops of the fluid extract of hydrastis four times a day in cases of vomiting of pregnancy. The

drug acts by reducing the arterial pressure, relieving the congestion of the uterus and by calming the excitability of the vaso-motor centres of the gastrointestinal tract.

The testing of fats with acetic acid is recommended by Ferd. Jean (*L'Industrie laitière*, June 26) for recognizing their purity, and as control experiments of results obtained by other methods. Equal measures of the acetic acid (spec. grav. 1·056) and the fat, 3 cc. of each, are introduced into a narrow graduated tube, the fat being previously heated to 50° C., and the acid measured at 22°; the tube is placed in a water-bath, agitated occasionally, and when the two liquids have completely separated, the volume of undissolved acid is noted. It has been observed that under the conditions stated the following fats dissolve different quantities of the acetic acid; namely, cocoanut oil, castor oil and mineral oil, each 100 per cent.; butter from nine districts, 63·33 (from two other districts, 58·33 and 73·0, respectively), Indian poppy oil, 63·3, beach nut oil, 53·3, French poppy oil, 43·3, neats' foot oil, 43·3, ground nut oil, 43·6–41·65, palm oil, 4·00, nut oil, 36·6, olive oil, 35·0, mustard oil, 33·3, almond oil, 33·0, colza oil, 30·0, lard 26·66 per cent.; rosin oil dissolves nothing.

Artificial gum arabic.—For the preparation of a so-called artificial gum arabic the *Rev. de chim. indust.* (through *Nouv. Remèdes*, 1892, No. 13 supplem.) gives the following process: 10 kilograms linseed are boiled with 80 kilograms sulphuric acid and 100 litres of water for three or four hours. The liquid is then filtered and four times its volume of alcohol is added. The precipitate is collected, washed and dried. The product is amorphous, colorless, insipid and gives with water a thick mucilage.

Parsley.—Dr. Mourgues (*Soc. chim. de Paris*, June 24, 1892), isolated from parsley a higher homologue of apiol which he named cariol $C_{14}H_{18}O_4$. It polymerizes easily and yields a penta-brom-cariol $C_{14}H_{13}Br_5O_4$. The physiological action of cariol is similar to that of apiol, but weaker.

Strontium preparations.—Dr. Bardet (*Rev. de Thérapeut.*, 1892, 410), prescribes the iodide and bromide of strontium in a like manner as the salts of potassium and sodium, however, without the fear of producing gastric intolerance.

Syrup of strontium bromide.—Syrup of sweet orange, syrup of bitter orange aâ 150 gm., strontium bromide 30 gm.

Solution of strontium iodide.—Distilled water 300 gm., strontium iodide 20 gm.

Solution of strontium lactate (C. Paul)—Distilled water 250 gm., strontium lactate 50 gm.

Antimony, phenol and bromides in whooping cough.—Dr. Liebermeister (*Rev. gén. de Clin. et de Thérap.*, June, 1892) recommends the following treatment.

(I) During the catarrhal period, rest in bed, and administration of the following mixture: golden sulphuret of antimony 0·50, mucilage of gum acaciæ 20·00, distilled water 50·00, simple syrup 20·00. Teaspoonful every hour or two.

(II) In the convulsive stage: inhalations of solution of sodium phenate, potassium bromide or sodium salicylate, and a potion of cochineal and potassium carbonate. To combat the paroxysms of cough use narcotics (opium), anæsthetic (morphine) or inhalations of 10–20 drops of ether 4 parts, oil of turpentine 1 part. Lastly give quinine and a potion consisting of extract of belladonna 0·50, syrup of ipecac 25·00, wine of antimony 10·00, and distilled water 150·00 gm. Dose, from two to six teaspoonfuls during the day.

(III) A sojourn in the country.

Bismuth benzoate has been prepared by Vigier (*Le Progrès méd.*) by double decomposition between bismuth nitrate and sodium benzoate. It contains 27 per cent. of benzoic acid, and has been recommended as an intestinal antiseptic.

Benzonaphthol is regarded by Dr. Gilbert (*La Tribune méd.*) as a valuable intestinal antiseptic which is not altered in the stomach, but is decomposed in the intestine into benzoic acid and naphthol.

Asaprol or *calcium β-naphtholsulphonate*, according to Stackler (*Comp. rend.*, cxiv, 1027), may be readily obtained by operating with pure β-naphthol, free from the *α* modification. It is freely soluble in water and alcohol, has a neutral reaction, is not irritating, is but slightly poisonous and is excreted through the urine. It acts as an antipyretic in various infectious diseases, and when used in comparatively large proportion prevents the development of the bacteria of cholera, typhoid and anthrax. Physiological experi-

ments made with rabbits showed that injection of 0·5 gm. per kilo of body weight caused death in a few hours; 0·285 gm. proved to be injurious, but 0·160 gm. injected every two or three days, or 0·06 gm. every three or four hours, were well supported for two weeks, and the latter for two months.

Ammoniated essence of lavender for smelling bottles.—The *Revue de Thérapeutique*, 1892, 418, publishes the following formula to be used in smelling bottles with pieces of ammonium carbonate. Alcohol, 250 cc.; oil of lavender, 10 cc.; oil of bergamot, 12 cc.; oil of cloves, 5 cc.; oil of cinnamon, 5 cc.; oil rose, 1 cc.; tincture of musk, 10 cc.; concentrated ammonia, 250 cc.

Mineral Waters of Japan.—Dr. Michaut (*Bull. de Thérapeut.*, 1892, I, 549 and II, 27), publishes analyses of a number of mineral waters of Japan:

Atami: Sodium chloride, 3·790; magnesium chloride, 2,333; potassium chloride, 1·810; calcium chloride, 1·767; calcium sulphate, 0·190; calcium bicarbonate, 0·004; ferrous carbonate, 0·003; silica, 0·003; bromides, 0·110; manganese, trace; total, 10·007 gm. in 1 litre water.

Ashinoyou: Sulphuric acid, 0·3760; calcium carbonate, 0·0423; potassium silicate, 0·1390; magnesia, 0·0324; phosphates, traces; alumina, 0·0430; chlorides, traces; sodium carbonate, 0·0243; organic matter, traces; potash, 0·0109; oxide of iron, traces; total, 0·662 gm. to 1 litre. Besides the above this spring contains also considerable sulphuretted hydrogen.

Arima: Sodium chloride, 14·717; potassium chloride, 1·281; calcium chloride 2·896; magnesium chloride, 0·241; aluminium chloride, 0·029; lithium chloride, traces; ferric carbonate, 0·246; manganese oxide, 0·055; calcium sulphate, 0·014; silica, 0·058; undetermined salts, 0·118; organic matter, traces; total, 16·655 gm. to 1 litre.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Salol-coated pills have been recommended like keratin-coated pills when the pills are not intended to dissolve in the stomach, as the salol is only decomposed in the duodenum into phenol and sali-

cylic acid. A solution made of 2 gm. salol, 0·5 gm. tannin and 10 gm. ether has been proposed for this purpose, but A. Suchomel doubts if such a coating is effective, and proposes dipping the pills into melted salol (it melts at 42° C.), contained in a small dish placed upon a water-bath for a few minutes; after taking the pills off the needles the small apertures are closed by applying a little melted salol with a small brush. The coating hardens almost as soon as taken out of the bath, and the pills have the appearance of being sugar-coated. It is suggested that boli containing extracts of pomegranate or male-fern, koussin, etc., be coated in this manner since it is much easier accomplished than keratin-coating; gelatin capsules can also be coated by immersion in the melted salol, one-half being dipped, withdrawn and then the other half dipped.—*Phar. Post*, 1892, 899.

Ipecacuanha assays.—The following criticism of the present methods of extracting emetine was arrived at after a considerable period of laboratory observations: (1) Zinoffsky's method, titrating with Mayer's reagent gave such discordant results that it was soon rejected. (2*a*) Flückiger's method, extracting the powdered root with hot chloroform-ammonia, is not complete after prolonged extraction (more than ten hours), and gives a residue which is largely contaminated with resinous substances. (2*b*) The method modified by Kremel, by dissolving the residue in dilute acid, liberating the alkaloid with ammonia and extracting with chloroform gives very low results since the alkaloid is not completely removed (ten extractions with 30 cc. chloroform failing to remove it entirely), the greater the excess of ammonia used the greater the difficulty. Experiments proved that if pure emetine dissolved in water be agitated repeatedly with chloroform the fifth extraction was found free from alkaloid; hence, the deduction that the root contains substances soluble in chloroform, which later prevent the removal of emetine; or again, it was found that heat rapidly decomposed the alkaloid; a temperature of 50° C. turns it of a brown color and causes it to react differently towards reagents. (3) Kremel's assay, drying a paste made of root, lime and water and extracting with chloroform, was shown to give low results, owing to the difficulty in extracting (after thirty hours the residue was not exhausted) and that the residue obtained was not soluble in dilute

acid. (4) The extraction of the root with ammoniacal alcohol, evaporating to dryness and exhausting with chloroform also gave low results; but here the explanation, verified by experiment, is that emetine warmed with solutions of ammonium salts causes the liberation of ammonia and then the alkaloidal salt produced escapes extraction by the chloroform. (5) A modification of Lloyd's method gave low results, a residue almost black and impure, and incomplete extraction. This method, however, suggested the following one which gave the best and most exact results. (6) It is advisable to extract the powdered root without drying it, since heating makes the extraction of the alkaloid more difficult; moisture should, therefore, be estimated in a separate portion. 15 gm. powdered ipecac are placed in a bottle with 148 cc. 90 per cent. alcohol and 2 cc. hydrochloric acid, sp. gr. 1·12 (measured at 15° C.), and digested, with frequent agitation, at 40° C. for four days; after cooling to 15° C. 100 cc. are removed, mixed in a capsule with 20 cc. of a 10 per cent. alcoholic lead acetate solution (50 per cent. alcohol) and, after the addition of 1·5 gm. slaked lime, evaporated, with occasional stirring, to a pasty consistency; 5 gm. powdered glass are then incorporated, heating continued on a water-bath with constant stirring until a dry powder results; this is then extracted for 10 hours with chloroform, the chloroform solution evaporated in a weighed vessel, dried at 100° C. and weighed. This gives a crude alkaloid which is then dissolved in 2 cc. normal hydrochloric acid the insoluble matter gotten upon a weighed filter, thoroughly washed, dried and weighed. The total residue minus the weight of the insoluble resin leaves the weight of the pure alkaloid.

The percentages as given below are calculated to dried drug; in methods (4) and (5) after repeating the extraction and making allowance for resin present the percentages agree closely with those in method (6).

Ipecac.	2a. Per Cent.	2b. Per Cent.	3. Per Cent.	4. Per Cent.	5. Per Cent.	6. Per Cent.
Rio, ...	3·09, 3·12, 3·00	1·72, 1·86	1·72	1·74	2·60	2·37, 2·24
Singapore, .	3·04	1·62, 1·74	—	—	—	2·22, 2·30
Carthagena, .	2·24, 2·10	1·23, 1·38	—	—	—	1·81

—G. Kottmayer, *Pharm. Post*, 1892, 913 and 933.

Salol-emulsion.—Salol is best taken internally in the form of an emulsion, made by melting 10 gm. salol in a capsule or water-

bath, transferring to a warm mortar, mixing with 5 gm. powdered acacia and emulsifying after the addition of 7·5 gm. luke-warm water; this accomplished, 10 gm. more of the warm water are added and the mortar with contents allowed to cool before adding the remaining quantity of water. If the warm emulsion be diluted at once with the full quantity of water, the salol will separate as a crust in the vessel and agitation will not loosen it; prepared as directed, the salol separates as a very fine powder, and is easily incorporated by agitation. The emulsion has the odor of salol, but is nearly tasteless; sweetened with syrup it is a very desirable preparation for children. For dispensing a concentrated emulsion is convenient since it is also permanent.

Salol-glycerin.—Ten gm. salol, 5 gm. acacia and 7·5 gm. water are emulsified as above and then after cooling diluted with glycerin to make 100 gm. It forms a thick, milky mixture, separating the salol as a very fine powder which is readily incorporated again. Useful in throat affections, and adapted for application with a brush.

Salol-vaselin.—Made by melting 1 gm. salol with 9 gm. vaselin and stirring until cool. Used for chapped hands and lips, also for rough skin.—A. Suchomel, *Pharm. Post.*, 1892, 954, 955.

Antinonnin is the name given to a paste containing fifty per cent. ortho-dinitrocresol-potassium; to prevent the paste from drying out a small quantity of soap is added, as the absolutely dry salt is an explosive compound. Proposed first as a means of protecting trees from the ravages of insects, it has since been found to be a poison for all forms of lower animal life; in quantities of less than one milligram the pure chemical is a sure destroyer of mice, while two centigrams will suffice for rats, in consequence of which phosphorus pastes are to be superseded. As a preservative of wood favorable experiments are reported. It is generally used in aqueous solution 2 : 500, in which strength it can be advantageously used in the treatment of itch; for the development of poisonous symptoms very much stronger solutions must be used (1 : 30 applied with a brush produced poisoning of a horse). An objectionable property of the remedy is the intense yellow color which is in some cases removed with difficulty.—*Südd. Apoth. Ztg.*, 1892, 233 and 241.

Indicator in alkaloidal assaying.—The alkalimetric estimation of the alkaloids extracted in a crude state has been very unsatisfactory,

due to the lack of a suitable sensitive indicator; as such Dr. A. Partheil recommends iodo-eosine, but to be of advantage it must be used in an ethereal solution (0·002 in one litre ether). To the acid solution of the crude alkaloid 20 cc. of this ethereal solution are added, when after agitation the aqueous solution will be colorless and the ethereal solution nearly so; by titrating with $\frac{n}{100}$ alkali and agitating, the least excess of alkali causes the iodo-eosin to dissolve in the aqueous solution with rose-red color. The titrations require considerable time and must be carried out in a stoppered flask but these inconveniences are balanced to a certain extent by the indicator allowing titrations to be made with $\frac{n}{1000}$ alkali. The indicator is suitable for the estimation of strychnine, brucine, atropine, hyoscyamine, aconitine, coniine, morphine and cytisine; quinine cannot be titrated with it, probably for the reason that this alkaloid is so very soluble in ether and so insoluble in water.—*Apotheker Ztg.*, 1892, 435.

Pillyanine, the alkaloid of the South American *Lycopodium saururus*, has only recently been obtained in the crystalline form as white lustrous crystals melting at 64–65° C. It is easily soluble in water, alcohol and chloroform, less soluble in ether; the salts are deliquescent and unstable. The formula for the alkaloid is very probably $C_{15}H_{24}N_2O$. By distillation in hydrogen a volatile nicotine-like base is obtained, which is probably identical with oxyamyl-nicotine. Its powerful physiological action is exerted upon the nervous system; the hydrochlorate in doses of 0·1–0·2 is capable of killing a dog. The plant itself is used in Brazil as a tænifuge.—Arata and Cauzoneri (*Boll. chim. farm.*) *Apotheker Ztg.*, 1892, 404.

Succinic acid, according to Pasteur, is produced in the alcoholic fermentation in a definite ratio to the glycerin (1 : 5), other investigators reporting different results. Mr. Rau studied the fermentation of various sugars at 15°, 25° and 35° C.; in the absence and presence of air; and as caused by different kinds of yeast. His conclusions are: Low temperatures will not decrease the quantity of succinic acid, but will decrease the quantity of glycerin; the addition of nourishment to the fermenting liquid does not increase the yield of succinic acid, but strongly increases the yield of glycerin; the presence or absence of air during the fermentation is without influence upon both glycerin and succinic acids; an energetic action

of the yeast cells will generally augment the formation of succinic acid. Succinic acid independently of the glycerin formation is a normal product of the alcoholic fermentation.—(*Arch. f. Hygien.*) *Apotheker Ztg.*, 1892, 411.

Iodine.—Prof. Meineke found that iodine will not change when exposed to the air for a few hours; after five days' exposure the loss is so slight as to come within the limits of error; under the most favorable conditions for absorbing moisture (powdered iodine kept beside a vessel containing water under a bell-jar) it did not absorb more than 0·1 per cent.—*Chemiker Ztg.*, 1892, 1126.

Japanese plant constituents.—*Mosula japonica* (N. O. Labiatæ) a small plant having the characteristic odor of thymol, yielded 2 13 per cent. of a volatile oil sp. gr. 0·820 at 17·5° C.; odor, faintly thymol-like; freezing mixtures caused no separation of crystals until after treatment with strong sodium hydrate solution, when 44 per cent. of the oil taken separated; the stearopten was proven by analysis and tests to be thymol.

Valeriana officinalis var. *angustifolia*, Mig.—The root yielded 2·7 per cent. volatile oil (more than the European variety) of sp. gr. 0·805 at 17°, (lævogyre in 5 cm. tube — 55·5°); valerianic acid was identified as one of the constituents.

Datura alba, Nees.—The capsules before the introduction of chloroform, were used as an anæsthetic in Japan. The plant contains both hyoscyamine and atropine, the former being present in much the larger quantity.

Picrasma eilantoides, Planch. (Simarubaceæ), owing to its bitter taste is called "Nigaki" (Bitter wood); the bark of the wood was found to contain a crystalline body identical with quassin.—Dr. Shimoyama, with H. Ono, K. Hyrano, and T. Koshima.—*Apotheker Ztg.*, 1892, 439, 440, 458, 459.

Myrrholin, a patented solution of myrrh made by digesting the gum-resin with castor oil and alcohol, is intended for use as an embalming and conserving agent; capsules of the same have been prepared containing 0·2 myrrholin and 0·3 creosote.

Unguentum Myrrhæ made by heating together one part myrrh with ten parts of a mixture of wax and fixed oil, is used in eczema

answering as well as some of the newer antiseptics.—*Pharm Centralhalle*, 1892, 500.

Sozal is aluminium paraphenolsulphonate obtained by either dissolving aluminium hydrate in paraphenolsulphonic acid, or by double decomposition of aluminium sulphate and barium paraphenolsulphonate. It is brought upon the market in the form of crystalline grains of weak phenol odor, but strongly astringent taste; easily soluble in water, glycerin and alcohol, forming permanent solutions. In the clinical experiments very good results were obtained by its use as an antiseptic, although the bacteriological experiments were found to contradict this; attention is called to the case of iodoform where the same contradictory status exists.—Dr. Schaerges, *Pharm. Ztg.*, 1892, 489.

A test for sugar in urine depending upon the formation of indigo-blue is proposed by G. Hoppe-Seyler; the test can be applied directly with the urine since the albuminoid and coloring principles do not interfere (more than 2 per cent. albumen, however, interferes, and must be removed by precipitation with lead acetate); the test is carried out with very small quantities of urine, and it is to be regretted that the quantity of sugar cannot be titrated, but must be approximated from the intensity of the blue color. The examination is made by boiling for 15 seconds ten drops of the urine with 5 cc. of the reagent (0·5 gm. ortho-nitrophenylpropiolic acid and 1 gm. sodium-hydrate in 100 cc. distilled water); if the test becomes deep-blue at least 0·5 per cent. sugar is present in the urine. Normal urine added to the reagent in large quantity (1 cc.) may produce a green coloration, but a distinct blue coloration is not obtainable.—*Ztschr. f. Physiol. Chem.*, 1892, 83.

Semen Paullinia and Pasta Guarana.—Dr. H. Thoms gives the following method of assay for these substances; the method is a suitable modification of Waage's tea assay: An intimate mixture of 10 grams of the finely powdered seeds (or guarana) and 2·65 grams recently slaked lime is mixed with 100 gm. water, evaporated in the water-bath to 60 gm., then mixed with 50 gm. solution of subacetate of lead and 10 gm. fine sand and evaporation continued to dryness; the residue is extracted in a Soxhlet apparatus with chloroform; after distilling off the solvent the crude caffeine is dissolved in warm water, allowed to cool, filtered into a weighed dish, evaporated to

dryness, dried at 100° C. and weighed. The published statements that the drug contains from 3·9–5·0 per cent. caffeine (due to faulty assays) should be reduced according to Thoms' assays to 2·6–3·0 per cent. Prof. E. Schär sometime ago announced that from the acid solution of guarana ether extracted a crystalline substance behaving like morphine in some of its reactions; this same crystalline substance Thoms found to be present in the seeds and therefore to be a characteristic constituent of these two drugs.—*Pharm. Centralhalle*, 1892, 431.

THE CONICAL CORKY SPINES OF ZANTHOXYLUM.

The "Annals of Botany" for July contains an interesting paper by Mr. C. A. Barber, B.A. (Superintendent of the Agricultural Department of the Leeward Islands), on the corky spines of *Zanthoxylum*. The author traces the development of the corky spines of *Z. alatum*, as observed in fresh material supplied by the authorities at Kew. The corky cone appears to rise first as a sort of cushion beneath the thorn. In the earliest stage of its growth it is assisted by a lysigenous gland, which is found at its base. The tissue of this gland is differentiated by the formation of a small area of cells with granular contents, around which the neighboring cells become arranged concentrically, and the number of cells between the vascular ring and the epidermis becomes increased. In a more advanced stage, the cells on each side of the gland become collenchymatous, and the thorn becomes prominent, its cells elongating in the direction of its length. The cells outside the collenchyma then divide and form a meristematic layer at the base of the thorn, the cells nearer its apex becoming rapidly elongated, pitted and thick-walled. The change takes place more rapidly at the surface of the thorn, so that a hard tissue is formed around a softer core.

In the autumn the meristematic cells become sharply marked off from the underlying cells of the cortex, and are much shorter and more closely packed than before, assuming and retaining a brick-shaped character, rapidly taking the appearance of corky tissue, and exhibiting rings of growth, similar in nature and appearance to the rings of growth in the stem of *Pinus*. By the rapid increase of growth of the lower part of the thorn, after the capacity for growth in the epidermal cells has diminished, the tissues around the base of the thorn are ruptured by the tension, and the corky cushion of the

thorn becomes evident. The hardened or upper portion of the thorn soon shows at its base a line of separation, caused by a difference of form and the manner of thickening of the cells in its upper and lower part. A split across the top of the cushion and between it and the base of the spiny portion is thus formed. The latter ultimately separates from its corky base and leaves a scar, or causes a truncated appearance on the top of the corky cushion. In rare cases the spiny portion or part of it may still be seen adhering to the top of the corky cone. Mr. Barber appends to his paper a list of plants, the thorns of which have basal cork formation. This list includes plants belonging to the *Malvaceæ*, *Rutaceæ*, *Simarubeæ*, *Rhamnaceæ*, *Leguminosæ*, *Rosaceæ*, *Araliaceæ*, *Cactaceæ* and *Euphorbiaceæ*.—*Phar. Jour. and Trans.*, Aug. 6, 1892, p. 108.

PLANTS CAPABLE OF YIELDING TANNING MATERIALS.[1]

By F. E. Mafat.

Algarobilla.—The pods of different species of *Prosopis*, containing 60–65 per cent. of tannin; imported from South America, particularly Chili.—Leguminosæ.

Alder (*Betula Alnus*, Linn.).—In Europe *Alnus glutinosa* and *Alnus incana*, and in Japan *Alnus firma*, are indigenous. The bark, leaves and fruit contain 13 to 15 per cent. of tannin; the 36 per cent. given by some authorities may be doubted. The Japanese alder contains 25 per cent. of tannin and colors the leather but little; the European alder is used in Russia and gives a deep color. —Betulaceæ.

"*Arbousier*" (*Arbutus Unedo*) grows in Europe; its leaves are used for tanning in Asia-Minor and contain as much as 36·4 per cent. of tannin.—Ericaceæ.

"*Airelle-myrtille*" (*Vaccinium Myrtillus*, Linn.).—This plant, more commonly known as bilberry, is abundant in France, Germany and England. Its tannin is rapid in its action, and 3·5 kilos of the dried and ground plant will make 1 kilo of sole leather in a short time. The plant is best pruned like sumac, the leaves are not

[1] From an abstract in the *Journ. Soc. Chem. Ind.*, July, of a prize essay; reprinted from *Phar. Jour. and Trans.*, August 20, 1892.

affected by moisture when gathered, which cannot be said of oak bark.—Ericaceæ.

Alcornoque (*Bowdichia virgilioides* Humboldt), is South American; the root, wood, bark and leaves contained tannin.—Leguminosæ.

Acacia.—Various species of acacia yield the fruit or pods known as balibabalah, cassia grains ("grain de cassier,") bablah, neb-neb and Indian pods ("gousses de l'Inde"). Bablahs were first imported into Europe in 1830 as a mordant; the percentage of tannin in them is from 25–32, according to species. The exporting countries are India, Egypt, Nubia, Syria, Arabia, Senegal and Mauritius. Acacia extract contains a strong free acid, a tannin analogous to that of nut galls and a large quantity of a calcium salt.—Leguminosæ.

Andromeda.—Several species grow in Lapland and North America, where they are known as "sour-tree." The wood contains 4–8 per cent. and the leaves 10 per cent. of tannin.—Ericaceæ.

Birch contains a tannin in wood, bark and leaves which colors iron salts green. Davy gives 1·675 per cent. as the tannin contents; Villon, 3 per cent.; Fraas, 5·32 per cent.—Betulaceæ.

Bennet (*Geum urbanum*, Linn.) is wild in Central and Southern Europe; its roots, leaves and flowers are astringent, and according to Tromsdorff contain 42 per cent. of tannin free from gallic acid; others, however, give 4 per cent. in the whole plant.—Rosaceæ.

Bistort (*Polygonum Bistorta*) contains in its roots, stem, flowers and leaves "bistortannic acid" and a yellow coloring matter assimilable by hides; it haunts the marshy land of Southern France.—Polygonaceæ.

"*Behen rouge*" (*Statice latifolia*, Smith) grows in Persia, the Caucasus, etc. Its roots are used in Southern Russia as tan for skins, to which it imparts a dull, ochreous, red color.—Plumbaginaceæ.

"*Bois doux*" (*Inga vera, etc.*) is a tree of Mexico, Guadeloupe and the Indies, where it is known as cooroocoopully; its wood and bark are tanniferous.—Leguminosæ.

Bauhinia (*Bauhinia variegata*) grows in the Antilles and Central America; its wood and bark contain tannin.—Leguminosæ.

Bearberry (*Arbutus Uva-ursi*, Linn.) grows in France, Italy, Spain and Russia, and contains 14 per cent. of tannin in its leaves, accord-

ing to some authorities, and 36·4 per cent. according to others.—Ericaceæ.

Oak (*Quercus*).—There are seventy to eighty species of oak, comprising 275 varieties, about half of which inhabit the old world and half the new world. The hard oak dominates in Europe, and of its two varieties, *Quercus pedunculata* and *Quercus sessiliflora*, the latter has the bark, which is richer in quercitannic acid. Of other oaks, the following are given: *Q. Tauza*, 8 per cent. of tannin in its bark; *Q. Cerris* (hairy-cupped oak), 10 per cent. of tannin in bark; *Q. Ilex* (evergreen oak), 10 per cent. of tannin in bark; *Q. Suber* (cork oak), 10 per cent. of tannin in bark; *Q. Ballota*, 10 per cent. of tannin in bark; *Q. Mirbeki*, 12 per cent. of tannin in bark; *Q. coccifera* (kermes oak), 15 per cent. of tannin in bark; *Q. Ægilops* (valonia), 8 per cent. of tannin in bark; *Q. infectoria*; *Q. glomerata* (Russian oak). The above are African and European. Of American oaks may be mentioned: *Q. alba* (white oak), 7·85 per cent. of tannin in bark; *Q. tinctoria* (black oak), 6·47 per cent. of tannin in bark; *Q. rubra* (red oak), 5·55 per cent. of tannin in bark; *Q. coccinea* (scarlet oak), 7·78 per cent. of tannin in bark. It may be generally stated that oak bark contains from 7 to 18 per cent. of quercitannic acid, while the wood and leaves contain 5–7 per cent.—Cupuliferæ.

Chestnut (*Castanea vesca*), abundant in Southern Europe and North America; the wood contains 68 per cent. of water when felled, 43 per cent. three months after felling, the bark being left on, and 35 per cent. five months after sawing and stripping. The wood and bark contain 4 to 12 per cent. of tannin (castanea tannic acid).—Cupuliferæ.

Cornelian cherry (*Cornus mascula*, dogwood) grows in Europe, especially France; its bark, leaves and fruit contain 19·9 per cent. of tannin according to Gassincourt, and 8–9 per cent. in the bark according to some other analysts.—Cornaceæ.

Carob (*Ceratonia Siliqua*, Linn.) grows in Spain, Italy, France, Algiers and Egypt. Its fruit (St. John's bread) contains 50–55 per cent. of tannin.—Leguminosæ.

Carob of Judæa (*Pistacia Terebinthus*, Linn.) grows in the Levant, and gives rise to horn-shaped galls which contain 25 per cent. of tannin, and are called "caroubes."—Anacardiaceæ.

Conocarpus arborea and *C. racemosa*.—West Indies and Brazil;

its bark and fruit contain tannin. Its indigenous name is "mangle." —Combretaceæ.

Catechu.—The brownish-red catechu of Bengal is the exudation from the *Acacia Catechu* (Leguminosæ). The Bombay brown catechu is from the *Areca Catechu* (Palmeæ)—the areca palm. Gambier is the extract from the leaves of *Uncaria Gambier* (Rubiaceæ). To Bengal catechu have been ascribed of tannin 54·5 per cent. (Davy), 38·2 per cent. (Renard) and 48 per cent. (Villon). To Bombay catechu, 48·5 per cent. (Davy), 54·5 per cent. (Renard) and 55 per cent. (Villon). To gambier, 58 per cent. (Davy), 38–40 per cent. (Renard) and 65·79 per cent. (Villon). Catechutannic acid (mimotannic acid) colors iron salts green.

Canaigre (*Rumex hymenosepalum*, Linn.) grows wild in the marshy lands of the southeast of the United States; its bulbs contain 20–24 per cent. of tannin. Most other varieties of rumex also contain tannin.—Polygonaceæ.

Paraguay acacia (*Curupay*), of South America, contains 16–20 per cent. of "curupatannic acid."—Leguminosæ.

Divi divi (*Cæsalpinia Coriaria*), chiefly from Mexico and Venezuela, contains ellagitannic acid to the extent of 30–45 per cent.; it imparts a reddish brown color to leather.—Leguminosæ.

Eucalyptus (*Eucalyptus resinifera*) is used in New Caledonia, where it grows, as a tanning agent; the tannin in its leaves is estimated at 10–12 per cent.—Leguminosæ.

Fustic, young (*Rhus Cotinus*, Linn.) grows in Southern Europe, and contains a tannin which colors iron salts olive green.—Terebinthaceæ.

Spiræa (*S. Filipendula*, Linn.) has astringent flowers and roots.—Rosaceæ.

Strawberry (*Fragaria vesca*, Linn.).—The flowers and roots are astringent.—Rosaceæ.

Pomegranate (*Punica Granatum*).—The bark of this tree was used by the ancients as a tanning agent under the name "malicorium;" Davy attributes 18·8 per cent. of tannin to it. The shell of the fruit contains 22–25 per cent. of tannin, and is used for tanning in Japan; the wild pomegranate contains 46 per cent. of tannin.—Granateæ.

"*Gonakié*" (*Acacia Adansonii*), or red gum, yields very tanniferous fruit, which is used as a tannage in West Africa.—Leguminosæ.

Kino is the dried exudation or extract of several plants, of which the principal are: *Dipterocarpus erinaceus* (Africa), *Butea frondosa* and *B. superba* (N. India), *Pterocarpus Marsupium* (India), *Coccoloba uvifera* (Jamaica), and *Rhizophora Mangle* or mangrove (Mexico), whose leaves contain 18–20 per cent. of tannin; the first four are of the Leguminosæ. Kino contains 45–55 per cent. of "coccotannic acid."

Mastic (*Pistacia Lentiscus*, Linn.).—The leaves and bark contain 10–12 per cent. of tannin; used for tanning buffalo skins in certain countries.—Terebinthaceæ.

Mimosa.—The *mimoseæ* include a great many varieties of acacia; the most valuable bark is from Tasmania; the Australian produce contains 25 per cent. (*A. cyanophylla*)—45 per cent. (*A. pycnantha*) of tannin; *A. sentis* (6·32 per cent.) and *A. binervata* (30·40 per cent.) are from New South Wales.

Myrobalans, the fruits of several species of *Terminalia* (Combretaceæ;) their contents of tannin are variously given, 18·2 per cent. and 52 per cent. being the extremes; Loewe asserts the invariable presence of ellagic acid ($C_{14}H_{10}O_{10}$).

Galls are classified as European and Asiatic, of the latter there are Levant galls and Aleppo galls. The Levant galls contain 77·42 per cent. of gallotannic acid (Müller); the Aleppo galls contain 60–66 per cent. (Fehling). Villon gives the following for Aleppo and Levant galls: Black, 37–41 per cent.; green, 53–60 per cent.; white, 50–65 per cent. For Smyrna galls he gives: Black, 33–37 per cent.; green, 53–60 per cent.; white, 60–63 per cent. Renard gives 33–60 per cent. as a mean of all three kinds. Mierzinsky gives 60–66 per cent. as a mean. Of European galls, those of Morea and Istria are the best, and have some 40 per cent. of gallotannic acid; Italian and Hungarian galls follow, and those of Germany and France are least important. French galls contain 9–10 per cent. of tannin; German galls, according to Villon, contain 18–19 per cent. of soluble and 13–14 per cent. of insoluble tannin. Chinese and Japanese galls are from plants belonging to the terebinthaceæ, viz: *Rhus semialata* in China and *Distilium racemosum* in Japan; 69 per cent. is the mean of the many versions which have been given of the tannin in Chinese galls. Hungarian galls or "knoppern" are from oaks, and contain 20 to 35 per cent. of tannin. Bassorah galls are from an oak and contain 57 per cent. of gallo-

tannic acid according to Kathreiner, Eitner and others. Renard gives 27 per cent. and Villon 30 per cent., of which 3 per cent. is difficultly soluble. Bokhara galls are from the Indian tamarisk (terebinthaceæ); their percentage of tannin has been variously given from 26 per cent. to 50 per cent.

Osier (*Salix viminalis*) contains 7–10 per cent. of tannin in its bark, which is largely used in Northern Russia.—Salicaceæ.

Quebracho comes from nearly all the Eastern States of South America (source of aspido-spermine); red quebracho (*Loxopterygium Lorentzii*) contains 16–22 per cent. of "aspido-spertannic acid," while white quebracho (*Aspidosperma Quebracho*) only contains 10–11 per cent. At the Paris Exhibition of 1867, leather tanned with quebrahco was shown for the first time in Europe, and in 1874–75, the utility of this wood became recognized in France. In whatever form quebracho wood is to be used, exposure to air should be avoided as much as possible; a sample which had a titre of 20 per cent. of tannin when freshly cut was found to contain only 16 per cent. after six months' storage.

Red rhatany (*Krameria triandra.*—Polygalaceæ) grows in Argentina, Brazil, Chili and Alsace; its bark contains "rhatania-tannic acid." The dried extract is with difficulty distinguished from kino; the bark, however, contains 42·5 per cent. of tannin, while kino averages 50 per cent.

Pine.—The bark of *Pinus Picea* (Linn.) contains 6–7 per cent. of a variety of pitannic acid. *Pinus canadensis* (Linn.) is the hemlock (white spruce) so much used as tannage in the United States; the bark contains 8–10 per cent. of tannin. The bark of *Pinus abies* (Linn.) contains 7–8 per cent. of tannin. Villon found 25 per cent. of tannin in the inner bark of *Pinus Aleppensis*, 3 or 4 per cent. in the outer bark, and 7 per cent. in the cones.

Larch (*Larix europæa*) bark contains 1·66 per cent. of tannin according to Davy, and 5·8 per cent. in springtime according to Müller. There is no tannin in the wood of any of the Coniferæ.

Sumac is from several species of *rhus*, of which *Rhus coriaria* is the chief. The percentage of tannin in various sumacs is from 10–28 2 per cent.

Tormentilla reptans and *T. erecta* (Rosaceæ), wild in the Alps and Pyrenees, are employed as tannage in the Faroe Islands, where they produce a red leather. They contain tannin in the flowers

and roots to the extent of 31 per cent. according to Renard ("tormentillo-tannic acid") and of 17 per cent. according to others.

Willow.—The various species of *salix* (Salicaceæ) contain tannin in the bark and leaves; in the former it varies greatly, 1·4 per cent. and 16 per cent. having been found in different instances. Willow bark has long been used by tanners in Russia.

Mountain Ash (*Pyrus aucuparia*, Rosaceæ) contains 5–7 per cent. of tannin in its bark, 3·5 per cent. in its wood, and some also in its leaves and fruit.

Valonia, *Quercus Ægilops* (Cupuliferæ).—These well-known acorn-cups contain from 25 to 45 per cent. of tannin. The main varieties are: *Chamada*, 33·4 per cent., *Chamadina*, 35·4 per cent. and upwards, *Rabdista*, 30 per cent. and *Chondra*, 27 per cent. Powdered valonia is poorer in tannin than the cups, because before grinding the bark and wood chips are not completely separated.

ANALYSIS OF BEESWAX.[1]

By C. Mangold.

Owing to the great fluctuation of the acidity, saponification and iodine numbers of genuine yellow beeswax, adulteration with less than 6 per cent. of paraffin or ceresin is almost beyond detection. A process has been worked out by A. and P. Buisine, which the author thought was well worth trying. It is based on the decomposition of wax soap by hot potash-lime, which does not act on the paraffins, but decomposes the fatty matter with elimination of hydrogen, which serves as a measure of their amount. The paraffins may be extracted from the residue.

The author's investigations practically confirm those of Buisine, but he now recommends the following process: 2 to 10 grams of the wax is saponified by melting it with powdered potash-lime, the reaction being aided by stirring with a glass rod. After complete cooling, the soap is powdered, and intimately mixed with three times its weight of potash-lime, and the powder transferred to a thick-walled, pear-shaped bulb-tube, which is heated for three hours at 250° in a mercury bath contained in an iron vessel. This is provided with a lid, which screws on air-tight, and is pierced with four

[1] *Chem. Zeit.*, **15**, 799; *Jour. Chem. Soc.*, 1892 p. 1034.

apertures through which pass air-tight, respectively, the pear-shaped bulb, a thermometer, a thermostat, and a long tube open at both ends to condense any mercury vapor. A tube connects the pear-shaped bulb with a Hofmann's burette, in which the hydrogen is measured.

The author's process is, however, more particularly directed to the estimation of the paraffins. After three hours, when no more gas will be given off, the residue is powdered, and to prevent any loss the bulb-tube is also broken up, and the whole is extracted with light petroleum in a Soxhlet's apparatus. The petroleum is distilled off, and the residual paraffin dried at 110° and weighed. On applying the process to yellow beeswax of undoubtedly genuine origin, the amount of natural hydrocarbons was found to vary from 11·02 to 14·7 per cent., although in practice the average amount may be put down as 13·5 per cent.

A sample of Transylvanian wax, tested by the author, had an acidity equivalent of 16·66, and a true saponification number of 56·02, which pointed to adulteration with paraffin, or a similar substance. Analyzed by the author's method, the percentage of hydrocarbons came, indeed, to 28·12, corresponding with 17 per cent. of adulteration, calculated on the original sample. A sample of wax, which had been purposely adulterated with 8 per cent. of paraffin, showed on analysis 7·4 per cent.

The amount of hydrocarbons in samples of white wax varied from 10·93 to 15·48 per cent., but the purity of some of the samples was rather doubtful.

THE ASSAY OF JALAP.

By F. H. Alcock, F.I.C.

Numerous papers have appeared in the Journal from time to time on the subject of jalap and matters connected with it.

It is not, however, so much upon the quality of the drug and amount of resin which it contains that I wish to deal in this note as to give an easy method of ascertaining the quantity of resin in the drug or its preparations.

The official process and its many modifications do not appear to give entire satisfaction, and the conclusion I have come to after many trials is that the following process may prove to be in several ways more acceptable to pharmacists. It depends upon the great

solubility of jalap resin in amylic alcohol, and the comparatively small solubility of amylic alcohol in water, and is as follows: One gramme of powdered jalap—free from agglutinated lumps—is placed in a suitable bottle, and 20 cc. of amylic alcohol are added and shaken well from time to time. After a few hours strain the liquid off through a little cotton wool into a glass separator, wash out the bottle with 5 cc. amylic alcohol and place the washings on the marc in the funnel, repeat with 5 cc. more if necessary so as to ensure the presence of all the resin in the separator.

Now, shake up the amylic solution of the resin with small quantities of water at 50° C. (equal measures of hot and cold water will do), set aside for the liquids to separate, remove the lower aqueous layer, and repeat the washing with water until nothing more of a non-resinous nature is removed. Afterwards transfer the solution of the resin to a weighed dish containing 10 cc. distilled water, wash out the separator with a little amylic alcohol, placing the washings in the dish, evaporate on a water-bath in the usual way, and when dry, weigh.

The advantages of this method are:

(1) That less of the water-soluble matter is removed than by the official process.

(2) After careful treatment with the amylic alcohol no resin remains, rectified spirit dissolving from the residue only water soluble matters and no resin.

(3) It is a cheap process because common fusel oil once distilled can be used, but in this case more water-soluble matter is removed and more washing required.

The use of the water when evaporating off the amylic alcohol is to prevent the alcoholic solution creeping over the sides of the dish and consequent loss of resin.

As the vapor of amylic alcohol is not a pleasant one to inhale, the evaporation is best conducted under a good flue.

An examination of many samples of commercial powdered jalap sold in Birmingham and district confirms the often expressed opinion that the official standard of 10 per cent. of resinous constituents is too high at the present date.—*Phar. Jour. and Trans.*, August 6, 1892, p. 107.

BRITISH PHARMACEUTICAL CONFERENCE.[1]

TWENTY-NINTH ANNUAL MEETING AT EDINBURGH.

In accordance with the custom that has become established, the proceedings commenced on Monday evening, August 22, with a reception of visitors, in the Waterloo Rooms, by the President, Mr. E. C. C. Stanford, who was supported by several other officers of the Conference and by the members of the Local Committee.

At the first general meeting on Tuesday there was a very large attendance. The members of the Conference were welcomed by the Lord Provost, and after the usual exchange of mutual compliments the list of delegates was read.

The report of the Executive Committee was then read by the senior Honorary Secretary. It was very brief, and even less cheering than that of last year, the first point mentioned being the continued disappointment experienced by the Committee at the inability to record an increase in the membership of the Conference, notwithstanding the special efforts which have been made in that direction, during the last few years, with the view of maintaining the position of the Conference as a representative organization. The report continued by stating that the Executive Committee has met on various occasions during the past year and that, among other business dealt with, the suggestion of concurrent meetings of the Pharmaceutical Society and the Conference in provincial centres has been considered, though without any apparent prospect of advantageous issue. Mention was made of the severe loss sustained by the death of Emeritus Professor Redwood, a former President and active participator in the work of the Conference, and by the death of Mr. Thomas Hyde Hills, a former Vice-President and liberal promoter of the welfare of pharmacy. The report also stated that a further grant has been made to enable Mr. Cripps to continue his investigation of ipecacuanha, and that earlier publication of the "Year-Book" for 1892 may be hoped for, since a considerable part of the manuscript is now in the hands of the printers. It was also stated that sixty new members had been elected at the meeting of the Executive on the previous evening.

As the Conference does not aspire to becoming a wealthy body, the particulars of its financial affairs do not require great elaboration: and on the present occasion the Financial Statement read by the Treasurer, Mr. R. H. Davies, presented much the same items of expenditure as is usually the case.

The President then proceeded to deliver his address. Reverting to the inauguration of the Conference twenty-nine years ago by twenty-one pharmacists, who were then attending a meeting of the British Association, and to the rapid progress the organization had made between that time and the meeting held in Edinburgh in 1871, he proposed, by looking backwards, to trace the general progress that has been made by the world during the period the Conference has been in existence, with the object of inquiring whether pharmacy has kept pace with that general advancement. Before entering upon such a retrospect it was, however, natural that reference should be made to the gaps which have been left in the ranks of the Conference by the deaths of

[1] From Pharmaceutical Journal and Transactions, August 27.

Daniel Hanbury, Henry Deane, Brady, Stoddart, William Southall, John Mackay, John Williams, T. H. Hills, G. W. Sandford, and Redwood, for the sake of offering an affectionate tribute to their memory. But serious as these losses have been, the spirit of those who are gone still animates their survivors. There is still on their part the same desire to maintain the British Pharmaceutical Conference as an organization for the encouragement of pharmaceutical research and the promotion of friendly intercourse among pharmacists. In these respects the President claimed that the Conference has, in the past, amply fulfilled its promises, by furnishing a stimulus to investigation and by promoting feelings of mutual respect and esteem, not only among British pharmacists but also between them and their colleagues of every nationality. Proceeding to deal with the various features of national progress during the lifetime of the Conference, the speaker pointed out that within this period the trade of the country, as shown by its exports and imports, has nearly doubled: the parcel post, the sixpenny telegram, the modern practice of photography, the telephone, phonograph, microphone, and the typewriter have come into existence. While thirty years ago the first Atlantic cable was lying useless at the bottom of the ocean, there are now seven transatlantic telegraph lines in constant use. Within the same period town tramways have been introduced, the capital of railways has been more than doubled, and the annual number of their passengers has increased from 204 millions to 877 millions. By numerous inventions within the same period the rate as well as the safety of travelling by rail or steamships have been greatly increased. Immense economy has been effected in the use of coal as a source of motive-power, and by the extended use of gaseous fuel many branches of manufacture have been greatly improved. Electricity bids fair to become the source of light in the future, and for its production the enormous store of motive-power in running water is being utilized. By the care that has been exercised in preserving public health, the national death-rate has been marvellously reduced and the dangers of epidemic diseases have been mitigated. Since the time when the first meeting of the Conference was held the whole aspect of chemistry as a science has been changed, and, by its application, new branches of manufacturing industry have been created. The alkali trade has been almost revolutionized, and the cost of its products very materially reduced. Waste products that were formerly a source of nuisance and serious detriment to health and property have been made sources of profit even greater in some instances than the main products formerly obtained. In this way the hydrochloric acid and the "waste" of alkali works are now turned to useful account, and thousands of tons of ammonia are obtained from the waste gaseous products of shale oil works, smelting furnaces, etc., in addition to that furnished by gas works. As an incidental result of the application of scientific principles to the condensation of volatile hydrocarbons by refrigeration, there has grown up an enormous trade in the importation of dead meat from abroad, amounting last year to nearly three and a-half million carcases of frozen mutton, which were brought through the tropics and landed here in sound condition. Thirty years ago the tar of gas works could scarcely be got rid of, and at Edinburgh it was for a long time buried in the Musselborough sands at low water. Since that time it has become, like Aladdin's lamp, the source of almost fabulous wealth in money, in colors, and even in medicinal agents which go far to suggest that

Bishop Berkeley's almost forgotten laudation of the virtues of tar was a true prophecy. The extent to which this wonderful industry has developed is illustrated by the fact that the value of the coal-tar colors produced in the year 1878 amounted to no less than three millions sterling. Of that quantity two-thirds was produced in Germany, and though almost the whole of the raw material has been supplied from England, while the markets for the finished products are chiefly Bradford and Manchester, the superior science of German chemists has enabled the manufacturers of that country to establish a virtual monopoly of this industry, just as the English market in chemicals of all kinds is being taken possession of by German producers. Although this striking illustration of the way in which certain branches of British manufacturing industries have been placed at a disadvantage and forced into the background points to a deficiency which is only beginning to be recognized, it was pleasant to hear Mr. Stanford state that during the period now referred to there has been greater progress in the matter of education. There would be real ground for regarding that progress with satisfaction if it were the case that it had extended over the entire field of educational work. But the progress made has been almost exclusively confined to the primary education under school boards, and its beneficial effects, great as they will no doubt prove to be, have been restricted to the working classes. In all that relates to secondary, technical and university education, the progress in Great Britain has been towards a condition of relative barbarism. While Germany, with its twenty-three universities and various other means of promoting the cultivation of science so as to make it useful and a matter of familiar every-day appreciation by the public, is now enjoying in all branches of industry the well-earned fruits of patient labor during the past century, Great Britain has only eight universities deserving of the title, and of those four belong to Scotland, the entire population of which is not equal to London alone. It is to the educational poverty of this country in these directions that we must look for an explanation of the fact that we are being outstripped by competitors who actually did not enter upon the field of industrial enterprise until a few years before the British Pharmaceutical Conference was founded. Thanks are due to Mr. Stanford for having in his address so prominently directed attention to the prevailing deficiencies in regard to secondary and scientific education, and to the urgent necessity for their being efficiently remedied. At this point of the retrospect a question naturally arises as to what has been done to advance pharmaceutical education, and though Mr. Stanford generously expresses the opinion that it has kept pace with progress in other directions, the facts which he mentions are decidedly not in accord with the opinion he put forward. On the contrary, the statements contained in the recent report made by Dr. Stevenson, as the Government Visitor of Examinations, are directly opposed to the opinion that there has been much real advance in pharmaceutical education. What has been done is the result of individual effort and voluntary action. It has been hitherto altogether insufficient to leaven the mass of the pharmaceutical body or to justify the assumption that we have at the present time anything approaching to an adequate system of pharmaceutical education. In this respect there has been but little advance beyond the position that obtained when the British Pharmaceutical Conference met at Edinburgh in 1871. On that occasion it was well pointed out by a shrewd Scottish member

that not only should master pharmacists be able to instruct their pupils, but those pupils should be in condition to be instructed. It is impossible to read the reports of the Government Visitors of Examinations, and especially those of Sir Douglas Maclagan, without being impressed by the painful conviction that this is not the case, and that the majority of the youths who have entered the business of pharmacy have not been in a condition to be instructed in the practice of the calling they aspire to, or in the scientific principles upon which it is based. And yet upon the very same occasion it was admitted that if practical pharmacy is to arrive at anything like perfection, it must be upon a scientific basis. Under such conditions it is worse than folly to complain that there is over-education in pharmacy. It is culpable blindness to do so. The real fact is that pharmaceutical education, such as it is, is to a great extent spurious. So long as such a condition continues there can be no hope of sound and general improvement in the practice of pharmacy. That is opposed by an influence akin to the "Chinese cheap labor" deplored by Mr. William Nye. It is not, therefore, remarkable that Mr. Stanford discreetly abstained from answering the question he had propounded as to how far pharmacy in this country has kept pace with general progress. The answer could scarcely have been encouraging. The account given by Mr. Stanford of evils which the better class of pharmacists have to contend against is sufficiently formidable. The competition of limited liability companies and co-operative stores, the invasion of the chemist's special province by the illegal sale of poisons, the irregular business carried on at the open shops of doctors or under their cover, and the trade in proprietary medicines are, no doubt, all serious evils. But, in some respects, they have been brought into existence or promoted by those who complain of their prejudicial influence. In the case of proprietary medicines, for instance, which no less appeal to the gullibility of the "thirty millions, mostly fools," constituting the British public, than tiger's bones do to Chinese credulity, chemists have themselves contributed largely to the increase of their popularity. In regard to these articles we cannot agree with Mr. Stanford's suggestion that they should be really made the subject of letters-patent. Such a proceeding would give them the authoritative recognition which they are now wholly destitute of. The idea of abolishing the stamp duty on these articles appears to be equally a mistake. By that means they would be relieved from the imposition of a tax that was intended to and does, to some extent, restrict their sale. We fail altogether to perceive what possible good would accrue either to the pharmacist or to the public from the adoption of either course. It is probably impossible for legislation to counteract the effect of "bold advertisement" or to lessen its influence upon public credulity. The only remedy open to the pharmacist appears to be that of refusing to be an agent for the distribution of these articles, and that, perhaps, is more than can be expected. So far as illegal sale of poison is practised under cover of the secrecy maintained as to the composition of proprietary articles, there is reason to believe that this practice will before long be put a stop to, and that the dangers arising from concealed distribution of narcotic and other poisons, in the form of proprietary articles liable to medicine stamp duty, will cease to exist. The consequent appropriate regulation of the trade in such dangerous articles will tend to satisfy the demands which have so long been urged by coroners and by the medical profession in the public interest.

Want of space prevents further reference to several other interesting features of Mr. Stanford's Presidential Address, but we commend it to the careful perusal of all who are interested in pharmaceutical affairs, as being replete with information and matter for reflection. At the conclusion of the address a vote of thanks to the President, moved by Mr. Reynolds and seconded by Mr. Boa, was put to the meeting by Mr. Groves, and carried by acclamation. The report of the Unofficial Formulary Committee was then read by Mr. Martindale, stating that during the past year there had been little material for investigation, but that the Committee has work in hand for the future.

The reading of papers was then proceeded with. The notes on *Starch Digestion*, by Mr. G. A. Grierson, had reference to the relative digestibility of different kinds of starch, and gave an account of some experiments conducted by the author with a view of determining the differences in this respect. The result at which he arrived was that tous-les-mois, arrowroot and potato starch, are more readily converted by starch digesting ferments than the starch of wheat, maize, oats, or rice, the starch of roots being generally more digestible than that of seeds. The method adopted for testing was to boil a gramme of the starch or meal with water, making up the volume of liquid to 100 cc., then adding 1 cc. of pancreatic essence to the mucilage, and noting the time which elapsed before a drop of the mixture ceased to give a blue color with a dilute solution of iodine. In the case of tous-les-mois, this was ten minutes, and a similar result was obtained with arrowroot and potato starch. With the starch of wheat and rice a distinct blue coloration was produced after two hours' digestion, and in the case of maize starch a blue color was produced after a much longer time. Prolonged boiling of the mucilage was not found to affect these results. Similar differences were observed when malt extract was used instead of pancreatic essence. The author is of opinion that his observations confirm Cripps' recommendation of potato starch or arrowroot for use in testing the digestive efficacy of malt extract. Temperature was found to have some influence upon the time of digestion, the change being most rapidly effected at 100° F. Above that temperature the digestion of starch was much lower. On varying the dilution of the starch mucilage it was found that the stronger mucilage was digested more rapidly than weaker; this result being probably due rather to the dilution of the digestive ferment. On adding to the mixture of starch mucilage, and pancreatic essence, a small proportion of hydrochloric acid, the conversion of the starch was very considerably retarded; a fact which the author regards as pointing to the probability that some forms of dyspepsia may be due to low alkalinity of the pancreatic juice and its consequent inability to neutralize the acid contents of the stomach when they are emptied into the duodenum. The addition of sodium carbonate to render the starch mucilage slightly alkaline had a similar retarding influence upon the conversion of the starch. However, no such retarding effect was found to be produced when alcohol was added to a mixture of starch mucilage and pancreatic essence. It was noticed in the course of these experiments that the tint produced with iodine by different kinds of starch differs considerably, and that with some a larger proportion of iodine is required to obtain the same degree of coloration than with others. Mr. Grierson considers that this circumstance points to the presence of a reducing body in some kinds of starch which require larger quantities of iodine to produce an equally deep blue color-

ation. In the discussion of this paper Mr. Gerrard mentioned that he had found 125° F. the best temperature for digestion, and that in the case of meat the change was more rapid in proportion to the subdivision of the meat and the greater degree of dilution. Some doubt was thrown upon the iodine test by Mr. Dott, who preferred the method of determining the sugar produced.

The Electro-magnetic Current in Strychnine Poisoning.—Mr. James Mackenzie described his experience of its successful application to a dog that had been poisoned with strychnia. The animal had probably taken about a grain of strychnine and presented unmistakable symptoms of strychnine poisoning, but directly the current was applied to the spinal column its beneficial effect was evident, the muscular rigidity subsiding, and at the end of four hours the dog was sufficiently recovered to be able to walk home. In subsequent experimental trials with dogs under various conditions the same result was obtained, and Mr. Mackenzie suggests that this method of counteracting the effects of strychnine in cases of poisoning is worthy of further investigation.[1] Mr. Martindale suggested that hypodermic injection of apomorphine would be the most effectual antidote, but this was objected to by Mr. Gerrard as impracticable on account of the violent convulsions produced by strychnine. Mr. Groves mentioned that he had found repeated doses of chloral had a beneficial effect in cases of poisoning by strychnine, and Mr. Atkins stated that he had seen the galvanic current applied without success. In reply, Mr. Mackenzie said that apomorphine was not known at the time his experiments were made, and that he had brought the subject forward in order that it might be investigated, as the method might enable chemists to act in cases of emergency.

The Purity of Lithium Salts.—Mr. Wm. Mair examined samples of commercial carbonate and citrate of lithium. On converting the carbonates into sulphates and carefully purifying, he found that two out of seven specimens were free from impurity whilst the others contained minute traces of sodium, calcium, or magnesium carbonate. It was concluded that commercial carbonate of lithium, as now supplied, is reasonably pure and free from added extraneous matter. Seven samples of the citrate yielded very similar results, only two being chemically pure. None of the material examined was of German origin, and Mr. Mair suggests that home manufacturers might with benefit devote greater attention to perfecting the purity of chemicals used in pharmacy. Whilst admitting that certain British firms do maintain a high standard, the desirability of securing a general adherence to this standard was insisted upon. In reference to the remark concerning pure chemicals, Mr. Tyrer said that manufacturers were prepared to meet any demands provided buyers would pay the prices which pure articles must of necessity bear, but purity could not be expected while they were subject to competition with inferior articles.

Valerianate of Zinc.—Mr. W. A. H. Naylor has found time, in addition to performing his multifarious duties as senior Honorary General Secretary to the Conference, to conduct an investigation of the commercial varieties of valerianate of zinc. He procured seven samples, variously denoted as crystal-

[1] One of the earliest instances of the successful use of the electro-magnetic current in a case of accidental strychnine poisoning was reported in the Amer. Jour. Phar., 1855, p. 557.—Editor.

lized, B. P., or precipitated, and compared them with an experimental one prepared by himself, according to the official process, from chemicals of commercial quality. The results arrived at show that the valerianate of zinc used in medicine is not of uniform composition and does not meet the official requirements, the precipitated varieties being worst in this respect; further, that the valerianic acid used in the process of manufacture is prepared from an imperfectly purified fusel oil. It is suggested that the present Pharmacopœial test might well be amended to the extent of specifying the percentage of residue that should be left on ignition of the salt after being moistened with nitric acid, and 26 per cent. is proposed as the minimum. Mr. Hodgkin said that in regard to each article, their relative purity is entirely a matter of price, and it was generally agreed that more thorough definition of the acid in valerianate of zinc was desirable.

Animal Charcoal.—Mr. J. Hodgkin's paper on Carbo Animalis Purificatus is a brilliant example of the manner in which even apparently simple matters should be dealt with. In a most thoroughly practical paper he shows that it is impossible to prepare this substance so that the pharmacopœial requirements may be met, and that, were this hypothetical preparation of the B. P. in existence, it would be useless as well as costly. Mr. Hodgkin gives detailed instructions for the preparation of a good purified animal charcoal, and his paper may be taken as a type of what reports of such investigations should be. The President and Mr. Tyrer confirmed the statement as to the difficulty of supplying the B. P. preparation.

Strychnine Salts.—Mr. D. B. Dott has confirmed the results obtained by Mr. G. Coull in investigating the solubility of strychnine acid sulphate, and he emphasized the unsuitability of this salt for the preparation of hypodermic injections. He finds, too, that the neutral tartrate is but little better as regards solubility. The tribasic citrate is more soluble (1 in 37), and the hydrochloride still better (1 in 35·5). The conclusion drawn is, that, giving due regard to solubility, stability and neutrality, the latter is the best and most useful salt of strychnine for pharmaceutical purposes.

Eucalyptol.—Mr. R. H. Davies gave the results of the supplementary investigation conducted by himself and Mr. T. H. Pearmain in connection with eucalyptol from eucalyptus oils. They have obtained what they regard as a practically pure product, and are inclined to consider that it should be free from any characteristic odor and possess no rotary power.

At the close of the business proceedings on Tuesday the members were conveyed in carriages to Rosslyn to visit the celebrated chapel, and after partaking of tea at the adjoining hotel they returned to Edinburgh.

In the evening the President of the Conference and those officially connected with it and with the Pharmaceutical Society were entertained at dinner by the Chairman and Vice-Chairman of the Local Committee, and a very pleasant evening was passed.

Ointment of Red Oxide of Mercury.—In a note upon this ointment, Mr. F. Davis suggested that the frequently lumpy condition of this ointment is probably the result of a separation of the hard paraffin in consequence of too rapid cooling in its preparation, and that the Pharmacopœia direction to "mix the whole thoroughly" is not sufficiently explicit. He, therefore, recommends that the vessel in which the ointment is made should be placed in warm

water, and that the ointment should be occasionally stirred while cooling as a means of obviating the defect of lumpiness.

Podophyllum Emodi.—Mr. John C. Umney shows that the resin obtained from it yields a much smaller proportion of crystalline picropodophyllin, upon which its activity is supposed to depend, than does that prepared from *P. peltatum.* The Himalayan drug would, therefore, appear to be unsuitable as an alternative source of podophyllin resin prepared according to the official process.

Grape Sugar Estimation.—Mr. A. W. Gerrard points out that when Fehling's solution is made with a double amount of copper sulphate, and 100 cc. of it is treated with 3·3 grammes of cyanide of potassium, it retains its original sugar value, but during reduction gives no precipitate except on the disappearance of the blue color. The end reaction is, therefore, sharp and more exact than is the case in the ordinary Fehling's test.

Potassium Bromide.—Mr. Dott considers that the official tests for potassium bromide are fairly complete, but that the volumetric test with argentic nitrate is not by itself capable of determining the purity of a sample with accuracy. He finds a considerable variability in the composition of the commercial salt, and suggests that an additional test should be introduced into the Pharmacopœia, fixing a limit to the percentage of silver salt yielded by precipitation, and specifying a minimum percentage of loss on fusing the same in a current of chlorine.

Jambul.—An interesting paper by Mr. Thomas Stephenson, of Bombay, on Jambul and its influence on the action of diastatic ferments was read. This drug has been used as a remedy for diabetes sometimes with marked success, while at others it has completely failed, and it was with the object of ascertaining the cause of this discrepancy that Mr. Stephenson's experiments were made. On the assumptions that the efficacy of the drug consists in its power to arrest the action of diastatic ferments upon starch, and that its age, as well as the process employed in making medicinal preparations from it, may have an influence upon its therapeutic activity, comparative experiments were made with old and fresh seeds, and with liquid extracts prepared with and without the application of heat. It was found that the best result was obtained with the fresh kernels, and with a preparation which had not been subjected to the action of heat. The pericarp was found to have a much more feeble action than the kernel even when fresh. The method of testing adopted was to mix a definite quantity of starch mucilage with 2 grammes of malt extract, adding the different preparations of jambul, and then keeping the liquids at a temperature of 96° to 100° F. for two hours. The sugar was then determined by means of Fehling's solution. Mr. Stephenson is of opinion that the differences of the results thus obtained furnish an explanation of the discrepancies which have been observed in the use of jambul as a remedy for diabetes. As a practical result he suggests that a medicinal preparation of jambul should be made of the fresh seeds, discarding the pericarps and avoiding the application of heat. He finds that a weak alcoholic menstruum extracts the active constituents and gives a stable preparation, and he suggests that the process of re-percolation might be employed with advantage in the case of this drug. He also recommends that the therapeutic value of preparations of jambul should be tested on the lines laid down in his experiments.

The Alkaloid of Tea.—In this paper Mr. Allen stated that theine could be dried without loss of weight at 100° C., and that it undergoes decomposition when boiled with lime water. He recommended that in the analytical determination of theine, tea should be first extracted with water, and that after titrating the extract with lime or magnesia, the theine should be dissolved out of the dried mixture with alcohol. In the discussion of this paper it was remarked that the points which were beyond dispute had already been made known, and that in several respects the statements made were at least questionable.

Chloroform.—Mr. D. Brown discussed tests for the purity of chloroform, and gives exhaustive tables to show the relative value of samples of Scotch, English and German origin. His results show that it is possible to select chloroform of a very high degree of purity, whilst, at the same time, it would appear that the commercial article is by no means uniform in quality.

Aloes.—Mr. E. M. Holmes has endeavored to account for the differences in character and odor that distinguish Curacao aloes from the ordinary Barbadoes variety. Both are affirmed to be the produce of *Aloe vulgaris* (Lam.), which was introduced into the West Indies about the beginning of the sixteenth century. Mr. Holmes attempted to solve this problem three years ago, when he proved that the former kind is really obtained from *Aloe chinensis* (Baker), and the conclusion he arrived at was that the aloes of Curacao was probably modified to some extent by an admixture of the juice from the leaves of *Aloe spicata* and *A. Succotrina.* This has been disputed by Señor S. C. Henriquez, a manufacturer of aloes at Curacao, who sent specimens of his preparations to the Pharmaceutical Society's Museum in March of this year, together with some interesting information concerning the process of manufacture. These notes are quoted in detail in Mr. Holmes' paper, together with descriptions of the various methods adopted. It would appear that the length of time that has elapsed since the collection of the juice is an important factor in determining the characteristics of the finished product. Experiments conducted by Mr. Holmes, with the assistance of Mr. H. D. Fuge, point to the fact that the sooner the juice is dealt with after collection the larger is the proportion of soluble matter that can be extracted from the dried aloes by boiling water. The fact is noted also that Curacao aloes may differ considerably in appearance, being either dull, like Barbadoes, or vitreous, like Cape aloes. It yet remains to be shown whether the Barbadoes variety has the same origin as Curacao aloes, and to what the difference in odor is due.

Vortmann's Test for Hydrocyanic Acid.—Mr. H. Bowden thinks that this test has not attracted sufficient attention. It consists in adding to the suspected liquid a few drops of potassium nitrite solution and three drops of ferric chloride solution. The brown precipitate produced is dissolved in dilute sulphuric acid, the mixture boiled, then cooled, and ammonia added to precipitate the iron. After removal of the precipitate, dilute freshly-prepared ammonium sulphide solution is added to the filtrate, when a violet coloration is produced which changes in turn to blue, green, and again violet. Mr. Bowden has applied the test for the acid with great success, and describes a number of his experiments in detail. When cyanides are in question he prefers to liberate the acid before testing. He considers that the extreme delicacy of the test,

conjoined with the great difficulty experienced in detecting hydrocyanic acid in bodies long after death, should induce toxicologists to give it a trial.

The adjournment for lunch at the Waterloo Hotel then took place as on the previous day, and on reassembling the following papers were read :

Quinine Phosphate.—Mr. George Coull has recently investigated the composition of quinine phosphate and finds that there are *at least* two phosphates. He suggests that, in view of the practical importance of a difference in the percentage of alkaloid, it would be advantageous that a salt having a definite formula should be specified in the B. P. C. Formulary. *Barium hypophosphite* is another compound in which Mr. Coull has found considerable variation, and he recommends that the anhydrous salt be used and the standard of purity raised. In *phosphoric acid*, too, he has found silica present, and a simple test is suggested for its detection.

Cacao Butter.—The record of Mr. T. Maltby Clague's investigation into the melting point of cacao butter affords a remarkable instance of the manner in which variation in the behavior of different samples of a similar substance may often be explained by purely physical causes. Indeed, his experiments go far to prove that this substance may have its characteristics considerably influenced and even permanently altered by a temporary subjection to changes in its surroundings. In ten commercial samples of cacao butter he found the melting point varied from 73° to 91° F. The B. P. range is from 86° to 95°. A sample expressed by Mr. Clague from the nibs with the aid of heat melted at 91°, another obtained by percolation with ether, at 83°, whilst a third extracted in the same way from a prepared cocoa had a melting point at 96°. Certain of the commercial specimens were further treated by being heated consecutively to 105°, 120°, 150° and 180° F. The melting point in each case altered considerably under this treatment, for, being ascertained after each step, it was found to rise until it reached an apparent maximum, after which any further increase of temperature lowered it again. Maintaining an increased temperature for a length of time was also found to exert a distinct influence, a sample with a melting point of 75° F. having this raised to 86°, after being kept at a temperature just under 100° for two hours. It appears evident that such variability in the commercial product is the result of the application of heat in greater or less degree during the process of extraction; for a specimen prepared by percolation with ether from its unroasted nibs possessed a practically constant melting point of 86° F. Mr. Clague inclines to the opinion that a complete solution of the difficulty will only be obtained after a chemical investigation, and meanwhile he warns dispensers to exercise care in the selection of cacao butter suitable as a basis in suppository making.

At the conclusion of this paper Mr. Clague made some remarks on the methods of taking melting points.

Tincture of Cinchona—Messrs. E. H. Farr and R. Wright, continuing their investigations on tincture menstrua, gave particulars of their experiments with tincture of cinchona, and the results appear to indicate the advantage of the official macero-percolation process as compared with other methods in the preparation of this galenical.

Mr. F. C. J. Bird described *a novel pressure filter* of great simplicity, which he has found of value in making determinations by Mayer's method.

Mr. T. R. Carswell dealt at great length with the *action of iodine on phenol* in alkaline solutions under various conditions, and specially referred to the determination of this substance volumetrically.

Spurious Ipecacuanha.—Mr. T. H. Wardleworth's paper described *Ionidium Ipecacuanha*, and compared its structure with that of the root of genuine ipecacuanha.

Essence of Lemon.—Mr. Arthur A. Barrett described the manufacture of this essential oil as it is carried on in Sicily. He pointed out in the first place that the statement to be found in most books as to the use of the écuelle for this purpose is incorrect at the present time. The sponge process is now generally adopted in Sicily. In regard to the quality of the essential oil, it appears from Mr. Barrett's account that considerable differences may exist when the purity of the oil is undoubted, and that much depends on the condition of the fruit used and the time when the oil is made. Adulteration with turpentine, specially refined for that purpose, appears to be frequently practised, and to a very large extent. According to Mr. Barrett, English wholesale druggists are supposed to buy oil of low quality, the greater part of which is said to go to London, Manchester and Glasgow. The addition of turpentine is said to be secretly practised by the workmen engaged in the extraction of the oil; so that it is difficult for manufacturers to know whether the oil they make is really pure. The methods in use for testing the quality of lemon oil appear to be extremely crude, and to consist chiefly in reliance upon the sense of smell.

Concentrated Oil of Lemon.—Mr. A. A. Barrett has for some time been directing his attention to the separation of that portion of lemon oil to which the flavor is due from the terpene with which it is naturally associated. As in the case of many other essential oils, the terpene constituting the chief bulk of lemon oil is comparatively destitute of taste and odor. The characteristic taste of the essential oil of lemon belongs to a small proportion of another body which has a higher boiling point than the terpene, and also a higher specific gravity than ordinary lemon oil. Mr. Barrett does not give any information as to the chemical nature of the concentrated lemon oil, nor does he state how it is prepared, though it may be assumed that the method adopted is careful fractional distillation. The advantages of the article are said to lie mainly in its ready solubility in weak spirit and its greater suitability as a flavoring material in the manufacture of aërated beverages. Mr. Barrett points out that the specific gravity of the concentrated oil is its most important characteristic. It should not be less than ·900 if the whole of the terpene has been removed.

Myrabolanes.—Mr. A. C. Stark's paper dealt with the proximate analysis of commercial myrabolanes.

Tomatoes.—Mr. Frederick Davis dealt with the qualitative analysis of the tomato (*Lycopersicon esculentum*).

After the conclusion of the papers the President presented the books given in accordance with the Bell and Hills bequest, and the two volumes given by Mr. Thomas Hanbury, Mr. Laidlaw Ewing acknowledging these gifts in an appropriate speech. The Formulary Committee was reappointed, and, as a result of the motion of which Mr. Payne gave notice last year, it was decided that in future the practice of meeting at the same place and time as the British

Association should not be adhered to. On the motion of Mr. Boulton, seconded by Mr. Gill, it was decided that the next meeting should he held at Nottingham. The senior Honorary Secretary read out the names of the newly elected officers of the Conference; the announcement that Mr. Octavius Corder, of Norwich, had been elected President, being received with hearty applause, and after the usual votes of thanks to the President and to the officers and members of the Local Committee had been passed and responded to, the business proceedings were brought to a close.

The excursion to the Forth Bridge in the afternoon of Wednesday was favored by fairly good weather, and it afforded an excellent opportunity of examining that great engineering work. The members were afterwards hospitably entertained at Inveralmond House by Mr. George Mackay.

On Wednesday morning the weather became sufficiently fine before the commencement of the second sitting to admit of the ladies' party being conveyed to the Botanical Gardens under the charge of Mr. Rutherford Hill, and afterwards in two sections to Oswald House and Willowbrae House, where they were entertained at lunch, respectively, by Mrs. Buchanan and Messrs. Brown. In the evening the ladies met in the Drawing Room of the Waterloo Hotel, where there was a musical entertainment which had been arranged under the care of Mr. Buchanan. The smoking concert was as usual an attractive feature of the meeting, and was numerously attended.

On Thursday morning, at 8.45, the members mustered in the Princes Street Station of the Caledonian railway and proceeded by special train along a route unsurpassed by any other in Scotland for the varied beauty of its scenery to Killin, in the heart of the Perthshire Highlands. Shortly after mid-day, luncheon was served in the grounds of Finlarig Castle. The weather was very fine, and all arrangements excellently carried out, with great credit to the organizers and much enjoyment to the guests, numbering upwards of two hundred and fifty.

MEETINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The Massachusetts State Pharmaceutical Association held its eleventh annual meeting in Springfield, September 6, President H. M. Whitney in the chair. Among the subjects presented for discussion through papers or specimens were the following: Copper in the volatile oils of the aurantiaceæ; lactic acid and lactophosphate of calcium; cause of difference in color of compound extract of colocynth; Blaud's pills; poisoning by the root of Cicuta maculata; assay processes for sanguinaria and lobelia, etc. The cutting of prices was discussed in a paper by Mr. Canning, and the Association endorsed the plan of the Interstate Druggists' League, whose platform is to withdraw all patronage from any house knowingly furnishing cutters with medicines or proprietary articles, and to discontinue the sale of proprietary articles which are furnished to cutters by manufacturers or their agents. The officers elected for the ensuing year are: F. H. Butler, Lowell, president; M. L. H. Leavitt, Boston, Secretary, and T. B. Nichols, Salem, treasurer.

The New Hampshire Pharmaceutical Association had its nineteenth annual meeting at Keene, September 6. The address of President Currier, various

committee reports and several papers claimed the attention of the meeting. A. S. Wetherell, Exeter, was elected president; F. L. Way, Manchester, secretary, and A. D. Smith, Manchester, treasurer. The twentieth annual meeting will be held on the Isle of Shoals, September 5, 1893.

The North Dakota Pharmaceutical Association met in Fargo, August 2, and discussed mainly matters of trade interest. A. I. Widlund, Grand Forks, was chosen president; L. Christianson, Fargo, Secretary, and G. A. Day, Fargo, treasurer. It was contemplated to hold a special meeting at the World's Columbian Exposition next year.

The South Dakota Pharmaceutical Association convened at Sioux Falls, August 17, Vice-President Poppe presiding. Higher education in pharmacy was discussed by Prof. Shepherd of the State Agricultural College. R. M. Colton, Tyndall, was elected president; I. A. Keith, Lake Preston, secretary, and G. W. Lowry, Sioux Falls, treasurer. Yankton was selected for holding next year's meeting, August 16. J. M. King, local secretary.

The Pharmaceutical Association of the Province of Quebec held its twenty-second annual meeting in the Laval University, Quebec, June 14. President Gray, in his annual address, gave a brief historical sketch of the Montreal Chemists' Association, organized in 1864, reorganized in 1867, and extended in 1870, when the present Provincial Association was incorporated by the legislature. The pharmacy act of 1875 made examinations obligatory for carrying on the drug business. The printed Proceedings of 24 pages contain the address, the report of the Council, and the minutes of the meeting. The executive officers of the preceding year were re-elected, viz: Henry R. Gray, president; A. Manson, treasurer, and E. Muir, secretary, registrar and assistant treasurer; all residing in Montreal.

Printed reports of meetings of State Pharmaceutical Associations have been received as follows:

Kentucky. Fifteenth meeting. Pp. 116. See July number, p. 383.

Pennsylvania. Fifteenth meeting. Pp. 198. See July number, p. 385.

EDITORIAL.

New College Building.—In the May number, p. 281, we have given a brief account of the new building, and the alterations in the older buildings that had been contemplated for the past summer. On Monday, October 3, the lectures will begin, and we are much pleased to inform our readers that, at this writing, the lecture rooms and laboratories are practically ready for occupancy, and that both the didactic and laboratory instructions will not in the least be interfered with. As might be expected where such extensive building operations had to be completed in the course of a few months, some of the details, as for instance the arrangement of the collections, have not yet reached that state of perfection, which they had attained during an undisturbed occupancy of the quarters for eleven, and in some cases for over twenty years. But these are inconveniences which do not affect the students, whose needs and comforts have been amply provided for in every direction.

It is not our purpose to give a description of the College buildings as they appear at the present time; we shall defer this until the internal arrangements in the front building are all finished for occupancy; we may now mention that other changes, not mentioned in our May issue, were shown to be desirable, and accordingly were carried out during the summer. The most important of these changes is the location of the boiler house for the heating, ventilation, etc., of the buildings. Instead of placing the boilers under one of the three buildings as originally contemplated, it was found to be more desirable to erect a fourth building two stories high, in the northeast corner of the lot, where the annex to the chemical laboratory had been. Thus, in addition to the large boiler room, there has also been obtained a large annex to the chemical laboratory, and an annex of the same size to the pharmaceutical laboratory, nearly doubling the previous capacity of each laboratory.

The pictures of the front building, which have been published in several journals, are very fair and correct representations, taken from the architect's drawings; but in our opinion they do not do full justice to the imposing character of the building; we have, therefore, preferred to defer the presentation to our readers of a picture until it can be taken from the finished front.

We are pleased to note the fact that the work on the buildings has progressed without any accident, except a slight fire which occurred on the morning of July 15th from spontaneous combustion among some material stored in one of the laboratories. A hole was burned through the floor, but the fire was readily extinguished by means of a portable chemical fire engine, and the damage done was slight.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Jahresbericht, 1891. Vereinigte Fabriken chemisch-pharmaceutischer Producte. Feuerbach-Stuttgart and Frankfurt a. M. 1892. 8vo. Pp. 96.

An interesting annual report, giving not only the commercial conditions of a large number of medicinal chemicals, mostly of organic origin, but likewise brief surveys of their therapeutic applications.

Mitteilungen aus dem pharmaceutischen Institut und Laboratorium für angewandte Chemie der Universität Erlangen, von A. Hilger.

Communications from the pharmaceutical Institute and Laboratory for applied chemistry of the University of Erlangen.

These reprints from the Archiv der Pharmacie comprise essays on the chemical composition of ancient Egyptian eye-paints, by H. Fischer; on the constituents of Menyanthes trifoliata and Erythræa Centaurium, by K. Lendrich; on absinthiin, by Oscar Senger, and on the fruit of Capsicum annuum, by Theo. Pabst.

A Manual of Chemistry, inorganic and organic; with an introduction to the study of chemistry. By Arthur P. Luff, M.D., B.Sc. (Lond.), etc. Illustrated with 36 engravings. Philadelphia: Lea Brothers & Co., 1892. 12mo. Pp. xvi and 525. Price, cloth, $2.

The book is intended for students of medicine and the author being connected with medical schools in London as demonstrator of chemistry, lecturer on medical jurisprudence and toxicological chemistry, and examiner in

forensic medicine, is obviously familiar with the wants of medical students. The book is divided into four parts, viz: introduction, comprising chemical physics and theoretical chemistry; non-metallic elements; metallic elements, and organic chemistry; and an appendix has been added as Part V, containing instructions in the calculation of chemical problems, and an outline of qualitative analysis. As may be judged from the size of the volume, it can give only the mere outlines of chemistry; but these, as a rule, are well presented. The rare elements are omitted, they being of no medicinal importance, but cadmium, we think, should have deserved recognition, since a few compounds have been, and to some extent are still, employed as remedies. In a few cases vague or partly incorrect statements have been observed; thus, p. 412, it is said that all the chloroform of commerce is prepared by the decomposition of chloral; on p. 465, the purgative principle of jalap is called jalapin, while chemists have named it convolvulin, and to avoid the existing confusion, the name jalapurgin has been more recently recommended for it; on p. 469, chrysophanic acid is asserted to be also known as pure chrysarobin and to be a constituent of araroba and rhubarb root. We regard the book as well adapted for aiding the medical student in the acquisition of a sound knowledge of the fundamental principles of chemistry, and consider the introductory chapters more especially as presenting the theories of composition and combination in a satisfactory manner for this purpose.

Education of Business Men.—Published by American Bankers' Association. New York. 1892.

Two pamphlets, covering together 55 closely printed pages and containing an address by Prof. E. J. James, of the University of Pennsylvania, together with various reports, letters, etc., refer to the founding of schools of finance and economy.

The Twentieth Annual Report of the Zoölogical Society of Philadelphia. 1892. Pp. 21.

An appendix to the report contains lists of animals bred in the zoölogical garden during the past year, and of acquisitions by purchase, exchange and presentation. The total number of animals composing the collection, February 29 last, was 1,001, valued at $47,567. The Society was incorporated March 21, 1859.

The Wills Eye Hospital. Report for the year ended December 31, 1891. 8vo. Pp. 25.

The total number of patients treated at the clinics during 1891 was 12,280, and the number of operations performed 2,763. The Hospital was founded April 2, 1832.

The Principles of Theoretical Chemistry, with special reference to the constitution of chemical compounds. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University. Fourth edition, thoroughly revised. Philadelphia: Lea Brothers & Co. 12mo. Pp. 322. Price, cloth, $2.00.

We are much pleased to note the appearance of a new edition of this work which, upon its first appearance, supplied a want that had been seriously felt, and which, we believe, has exerted a very gratifying influence in promoting the study of chemical philosophy. The intrinsic value of the work has also been

recognized abroad, and translations of it into the German and Italian languages have been well received in Europe. The author states that his object has been and is, to help students to get clear ideas in regard to the foundations of chemistry. Any one who examines the book will acknowledge that the author has thoroughly accomplished his object, for it would be difficult to find a treatise on theoretical chemistry giving in so compact a form a more lucid and comprehensive account of the theories of the science based upon more than a century's elaborate researches into the governing laws of the combination, composition and decomposition of matter. In the present edition the text has been thoroughly revised, and it was deemed desirable to add a new chapter on solutions—a subject which for a long time has claimed the attention of scientists, but of recent years has assumed considerable importance in relation to the molecular weights of chemical compounds.

An Illustrated Encyclopædic Medical Dictionary, being a dictionary of the echnical terms used by writers on medicine and the collateral sciences, in the Latin, English, French and German languages. By Frank P. Foster, M.D., editor of the New York Medical Journal, etc. Vol. III. New York: D. Appleton & Co. 1892. 4to. Pp. 1545 to 2320.

In the preceding volume (1891, p. 109) we have entered somewhat minutely into the scope and character of this grand work. The volume now issued opens with the word *fascia*, which, with its affixes and prefixes, occupies nearly six columns. The comprehensiveness of the work is well illustrated by the references to fever, also noted under *febris*, *Fieber* and *fièvre*, occupying, respectively, 14, 8, 1 and 1½ columns. The word *grass* has required nearly six columns, and the corresponding Latin, French and German terms (*Gras* and *gramen*) over one column. The French term *herbe* needed four and one-half olumns, the English *herb* about one-half a column, and the Latin *herba* and the German *Kraut* about one and a half columns each. These examples will show the great care bestowed upon the contents of the work as far as the number of references is concerned; and on close scrutiny it will also be found that no labor has been spared by the editor and his collaborators to make the information correct and reliable. The text extends to the word "Minjak-lagam." As we stated before, the typographical arrangement leaves nothing to desire; but particular commendation is due to the close attention paid to the proof-reading, and, in consequence thereof, to the freedom of the text from typographical errors.

Pharmaceutical and Chemical Problems and Exercises in metrology, percentage and proportion, fortification, dilution, specific weight, thermometry, chemical formulas and equations, including nine hundred chemical reactions, together with rules and explanations, also sufficient rules governing the latinity of pharmaceutical nomenclature and prescription writing; with aids to proper accentuation in pronouncing the latinic titles. Intended as an aid to teachers, students and examiners. By Oscar Oldberg, Ph.D., Professor of Pharmacy, Northwestern University. Second edition, revised and greatly enlarged. Published by the Apothecaries Company, Chicago. 1890. 12mo. Pp. 176.

The title of this work is so comprehensive as to give a full and correct idea of the contents of the book. Compared with the first edition it has not only been enlarged, but practically re-written. The rules and explanations given

are clear and satisfactory, and the examples and exercises given are so numerous—2,235—as to cover a very wide field of pharmaceutical knowledge and practice. Though the solutions of the problems are not given in the book, for obvious reasons, the intelligent student can easily and advantageously use it for home study.

Materia Medica and Therapeutics.—A manual for students and practioners. By L. F. Warner, M.D., attending physician St. Bartholomew's Dispensary, New York. Philadelphia: Lea Brothers & Co. Pp. 223. Price, cloth, $1.

This is volume 5 of "The Student's Quiz Series," edited by Dr. Bern B Gallaudet, of New York, and intended for the use of medical students. Like in other works of similar character, the subject matter is arranged in the form of questions and answers. Necessarily, the facts are given in the briefest possible manner, consistent with clearness and comprehensiveness. The classification adopted is based on the same principles as met with in larger medical works on materia medica, the remedies being grouped according to their chief medical properties. The author has taken notice not only of the pharmacopœial drugs and preparations, but likewise of the more important compounds introduced as medicinal agents during recent years. The little book may be made to do good service as a convenient remembrancer.

Ueber Sulphonsäuren einiger China alkaloide.—Zur Kenntniss der Cocablätter.

Two valuable papers by Dr. O. Hesse, treating of the sulphonic acids of several cinchona alkaloids, and of the constituents observed by the author in several varieties of coca leaves procured from different localities in South America, India and the East Indian Islands. The pamphlets are reprints from Liebig's Annalen, vols. 267 and 271.

Les Teintures alcooliques de la Pharmacopée française. Étude chimique et analytique; comparaison avec les pharmacopées *étrangères.* Par Albert Domergul. Marseille. 1892. 4to. Pp. 209.

The alcoholic tinctures of the French pharmacopœia.

A thesis presented to the Paris School of Pharmacy for obtaining the superior diploma of "Pharmacien de 1re classe." This elaborate essay on the eighty alcoholic tinctures of the French Codex comprises researches on the history of each formula, the physical and chemical characters of each product, including the extracts and ash obtainable, and the deposits formed on standing; and finally a comparison with the corresponding preparations of other pharmacopœias.

Foods and Food Adulterants.—Investigations made under the direction of H. W. Wiley, Chief Chemist. Part seventh. Tea, coffee and cocoa preparations, by Guilford L. Spencer, Assistant Chemist, with the collaboration of Mr. Erwin E. Ewell. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892.

The first part of Bulletin No. 13 of the Division of Chemistry, U. S. Department of Agriculture, was published in 1887, each part treating of a different group of articles of food and of the adulterations to which they are liable as met with in commerce. The part now before us treats of tea, coffee and cacao, and of chocolates in their various forms constituting those preparations of the last-named seed, which are the most important to the consumer. Very

valuable additions are the lists of publications, books as well as papers published in various journals and printed reports, treating of the subjects under consideration; and nine plates of heliographic reproductions of leaves and of microscopical views suitably magnified.

Experiments with Sugar Beets in 1891, by Harvey W. Wiley, chemist, etc., with the collaboration of Dr. Walter Maxwell, Prof. W. A. Henry and others. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892. Pp. 158.

Bulletin No. 33 of the Division of Chemistry, Department of Agriculture, is in continuation of previous bulletins recording the experiments made in different parts of the United States with sugar-producing crops.

Proceedings of the ninth annual Convention of the National Confectioners' Association of the United States. Official record of reports, circulars and communications for the year 1891–1892. Philadelphia: Confectioners' Journal Print. 1892. Pp. 170.

The meeting was held in Washington, D.C., commencing June 1.

A new Series of Reactions for Alkaloids. By Alfred Dohme, Ph.D. 12mo. Pp. 34.

Reprint from Pharmaceutical Review.

W. R. Warner's Therapeutic Handy Reference Book for Physicians. Fourth edition. Philadelphia. 1892. 12mo. Pp. 119.

The contents of this work were described on its first appearance in this Journal in 1889.

Medical Education and Legislation. By Geo. J. Engelmann, M.D., St. Louis.

An extract from the author's valedictory address to the graduating class of the Missouri Medical College, and reprinted from the Medical Fortnightly.

Appendix to the Catalogue of the Flora of Nebraska. By H. J. Webber. Pp. 47.

The "Catalogue" was published in the report of the Nebraska State Board of Agriculture for 1889. The present pamphlet, No. 9 from the "Contributions from the Shaw School of Botany," contains remarks on many species previously reported, and adds 432 others not previously known as growing in Nebraska.

VARIETIES.

Atropine as a Hæmostatic.—In two cases of profuse metrorrhagia A. N. Dimitrieff has obtained good results by the subcutaneous injection of *atropine* in doses of 0·0003 gram. In the first case the hemorrhage stopped after four injections; in the second after three. Atropine is sometimes of service when other hæmostatics have failed.—*Quarterly Therap. Rev.*, July, 1892.

Potassium dichromate has been used by Dr. J. H. Hunt (*Brookl. Med. Jour.*, August), as an expectorant with favorable results; the dose for a child one year old being $\frac{1}{10}$ grain, repeated in an hour, or if necessary at shorter intervals. To dispense it for this purpose it is best kept in the form of a trituration of one part of the salt with nine parts of milk sugar. A solution of this triturate rarely acts as an emetic.